REPORT RESUMES

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EXPLORATORY STUDY OF INFORMATION--PROCESSING PROCEDURES AND COMPUTER-BASED TECHNOLOGY IN VOCATIONAL COUNSELING. FINAL REPORT.

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AS A PRELIMINARY TO DESIGNING A MAN-MACHINE COUNSELING SYSTEM, THE GUIDANCE PRACTICES IN 13 SCHOOLS DISTRIBUTED THROUGH SEVEN STATES WERE SURVEYED TO STUDY THE VARIATIONS IN COUNSELING PRACTICES. ANALYSIS OF AN ACTUAL AND IDEAL SORT OF A Q-SORT DECK OF 48 CARDS, EACH CONTAINING A DESCRIPTION OF A DISCRETE COUNSELING ACTIVITY, INDICATED NO MARKED DIFFERENCES AMONG COUNSELORS FROM DIFFERENT SCHOOLS. HOWEVER, AS A GROUP THEY WOULD PREFER TO REDUCE GREATLY THE AMOUNT OF TIME SPENT IN ROUTINE PROCESSING TASKS. AFTER THE SURVEY, AN EXPERIMENTAL FIELD SITE, A LARGE SCHOOL COMPLEX IN THE LOS ANGELES SCHOOL DISTRICT, WAS SELECTED AS THE FOCUS OF THE SYSTEM DEVELOPMENT AND EXPERIMENTATION. A DETAILED SYSTEM ANALYSIS OF ALL THE SCHOOL'S COUNSELING PROCEDURES WAS MADE, AND WORKSHOPS ON INFORMATION PROCESSING TECHNOLOGY FOR THE COUNSELOR WERE CONDUCTED. TWO DESIGN TEAMS, ONE OF RESEARCHERS AND HIGH SCHOOL COUNSELORS AND ONE OF RESEARCHERS AND JUNIOR HIGH SCHOOL COUNSELORS, WERE FORMED TO SPECIFY MODEL I OF THE MAN-MACHINE SYSTEM. MODEL I WILL BE PROGRAMED TO SERVE AS (1) AN INFORMATION RETRIEVAL SYSTEM FOR STUDENT INFORMATION, (2) A TEACHING AND MONITORING SYSTEM WHICH WILL AUTOMATICALLY ALERT THE COUNSELOR WHEN CRITICAL SITUATIONS OCCUR, (3) AN AUTOMATED REPORT GENERATOR, (4) A PREDICTOR, (5) AN AUTOMATIC REMINDER, (6) A COLLECTOR OF FOLLOWUP DATA, AND (7) A DISSEMINATOR OF PROGRAMED INTERVIEWS. PHASE TWO OF THE PROJECT WILL INCLUDE DEVELOPING THE SOFTWARE SYSTEM, INSTALLING EQUIPMENT IN THE SCHOOLS, TRAINING COUNSELORS, DEVELOPING SYSTEMS PROCEDURES, COLLECTING POST-SYSTEM-CHANGE EVALUATION DATA, AND REPORTING. AN EXTENSIVE APPENDIX CONTAINS DATA COLLECTION INSTRUMENTS AND SPECIFIC PROJECT INFORMATION AND CALENDARS. (HC)

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Final Report

Exploratory Study of Information-Processing Procedures and Computer-Based Technology in Vocational Counseling

26 October 1967

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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TECHNICAL MEMORANDUM

(TM Series)

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Final Report

Exploratory Study of Information-Processing Procedures and Computer-Based Technology in Vocational Counseling

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ABSTRACT

The purpose of this phase of our work was to design a man-machine counseling system.

Before the design work began, we surveyed the counseling and guidance operations in thirteen schools distributed over seven states in order to study the variation in counseling practice among schools. This variation could then be considered in system development work with the schools selected for the man-machine study.

After the survey, an experimental field site was selected. The focus of system development and experimentation is a large school complex in the Los Angeles School District. We performed a detailed system analysis of all the counseling procedures employed in this school complex, and conducted workshops on information processing technology for the counselors.

Two design teams were then formed to specify Model I of the man-machine system. One team consisted of the SDC researchers and the high school counselors; the other, of the researchers and the junior high school counselors. Some of the major ideas which emerged from the design sessions are:

1. An information retrieval system for student information.

2. A tracking and monitoring system which will automatically alert the counselor when critical situations occur.

3. Automated report generation for preparing cumulative records. report cards, and other reports or lists.

ACKNOWLEDGMENTS

We are indebted to many people for their help. We should especially like to thank:

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Mr. John Hawkins, a student at the University of Utah, who, although he spent only a few months with us as a summer associate, helped us greatly with his prodigious programming talents and the clear wisdom of youth.

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CHAPTER 1.

INTENT OF STUDY

To fill his many roles effectively, the vocational counselor must be able to collect, organize, and use large amounts of detailed information about many different students and many different vocations. This information-processing task has been greatly complicated by increasing student populations, the resultant increase in student information, and a rapidly changing pattern of vocational fields. Progressively greater amounts of valuable counselor time are spent in collecting, processing, and maintaining fairly routine information, so that the counselor has less time for such vital activities as the face-to-face interviews with individual students.

A partial solution to this problem of information overload is the application of information processing technology. Steps in this direction are already evident, as witnessed by the widespread use of test scoring machines, mark sense cards, punch card systems, and electronic data processing machinery for the recording, storage, and retrieval of student information.

Developments in computer-based information processing make the application of information processing procedures to a wide range of counseling functions technologically feasible. In fact, suggestions for these applications are on the increase. Wrenn called for information centers where educational and vocational information on student characteristics can be electronically collected, analyzed, and transmitted to various members of the school staff.[1] Cooley suggested the use of the computer in counseling for developing complex prediction patterns, based upon multivariate analyses.[2] Kleinmuntz programmed a computer to simulate the decision-making behavior of a clinician in the task of identifying student maladjustment from Minnesota Multiphasic Personality Inventory Test profiles.[3] More recently, Tiedeman, *et al*, have taken on the task of implementing a theory of career development via a computer assisted counseling system for student users.[4]

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[1] Wrenn, C. *The counselor in a changing world*. American Personnel and Guidance Association, 1962.

[2] Cooley, W. W. A computer-measurement system for guidance. *Harvard Educational Review*, *34*(4), 1964, 559-572.

[3] Kleinmuntz, B. Personality test interpretation by digital computers. *Science*, *139*(3553), 1963, 416-418.

[4] Tiedeman, D., *et al*. A Harvard-NEEDS-Newton Information System for Vocational Decisions, 1965.

These applications should be freely encouraged and supported where routine clerical tasks are the functions that are being automated. But when automation becomes concerned with the more complex functions of counseling such as student appraisal and interviewing of students, many problems need to be considered before widespread application is seriously encouraged.

One of the most important problems to consider is the reaction of counselees and counselors to automated procedures. The tendency for counselors and counselees to accept automated procedures in the counseling process is probably much greater today than it would have been twenty years ago. Certainly, the trends toward increased use of automation in society, accompanied by the emphasis placed on the value of scientific objectivism and the prevalence of alienation in society, are consistent with this prediction. An illustration of this type of thinking is the argument that is sometimes voiced that the objectivity and greater reliability of the machine will cause it to perform better than the human. In light of the prevalence of these values, it would not be surprising to find students who would actually prefer interacting with a machine. It is also evident that some counselors and counselees will probably strongly resist some uses of the computer in counseling. The reaction of counselees and counselors to automatic procedures in the counseling process needs to be studied, but acceptance of automation in the counseling function should not be used as the ultimate criterion for deciding what functions will be automated. It is imperative that steps be taken to use automated procedures in counseling in such a way that they enhance the process without leading to further depersonalization of the activity.

Another problem that must be considered is the possibility that automated techniques will impose an arbitrary set of generalized procedures in counseling, thus eliminating the variability that current procedures allow counselors in their approach.

The purpose of this study was to explore these and related problems by designing and implementing a man-machine system for vocational guidance. Phase I involved the design of the system; Phase II will involve the implementation and field testing of the system. The work presented in this report is for Phase I.

Five major steps were planned for Phase I in the original proposal. These were: Survey of vocational guidance operations in the field; detailed system analysis of the counseling procedures employed at a selected experimental field site; design of a man-machine system by the counselors at the field site and the System Development Corporation (SDC) research team; formulation and development of computer programs in the SDC laboratory; and collection of initial evaluation data.

As the study progressed, it became increasingly apparent that the introduction of the computer into the counseling operation could accelerate the already present trends toward alienation and depersonalization. Despite our efforts to focus the design on the functions that both the men and the machine would play in the new system, we found that the major ideas that were developed in the design meetings were for the computer. Very little attention was given to what the counselor's role would be in the new system. This observation paralleled past experiences in the design of military man-machine systems. The counseling system was becoming more like a machine than either a man, or a system with functions equitably distributed to men and machine. Our concern for the role of the human became more acute when we analyzed some of our data on counselor attitudes. These data suggested that actual experience working as a guidance counselor in schools tends to increase the positive value placed on data manipulation. This observation caused us to fear that once the computer is installed the counselors will use the extra time that would be gained to become more involved with data than with students.

The awareness of these trends toward depersonalization resulted in a major focus on trying to find ways to offset the trend. We wanted to make the counseling operation more humanistic and to find procedures for system development that are more humanistic. The focus was to try to make the human being (both the counselor and the counselee) central to the system and to make the process open to the control of those human beings who would comprise and use the system. We took three additional steps beyond those in the original proposal. One of these steps was to use a communication facilitator in the design process. This is discussed in Chapter 4, "Training and Design Meeting." The other two steps were developed in a reaction to the apparent trends toward depersonalization. One of these two steps was the initiation of a training program in group counseling techniques. The other step was an ethical analysis by a class of graduate students at UCLA, or the design plan for the man-machine counseling system. These two steps are discussed in Part III, "Toward a More Humanistic Approach."

We also expressed our concern for humanistic values in our development of the computer programs. We designed a user language for counselors that allows each counselor to create and use his own language to communicate with the computer. This innovation permits freedom of counselor style and preference, avoiding the imposition of rigid standardized procedures in communicating with the computer. These developments are discussed in Part II, "Formulation of the Machine System."

This report is organized as follows: Part I (Chapters 2 through 4) presents the initial analysis and design efforts. This part reports the results of the survey of vocational guidance practices, the results of the system analysis of the experimental high school and junior high school, and the procedures used for and the results of the training and design meetings. Part II presents a discussion and description of the computer programs. Part III is the report on the group counseling program and the ethical analysis by the students. Part IV provides the results of the evaluation data that have been collected, and Part V provides a summary and plans for Phase II, "The Implementation and Trial Evaluation Phase."

PART I

INITIAL ANALYSIS AND DESIGN

A survey of counselor practices in thirteen different educational settings was made to familiarize the research staff with general counseling practice. The results of the survey indicated that counselors are involved in much the same type of activity regardless of setting, but there was a marked difference between what they are now doing and what they would like to do in an ideal situation.

Two schools from the survey were selected to participate in the actual system design: Monroe High School and Sepulveda Junior High School in the Los Angeles School District.

A detailed system analysis of the counseling procedures at each of these two schools was made. Following this, the counselors participated in the training workshops to acquaint them with the capabilities and limitations of advanced information processing technology.

With this background, the SDC research team and the counselors participated in design workshops to formulate the specifications for the initial model of the man-machine system.

This section includes a detailed description of these procedures and the initial design which emerged as a result.

CHAPTER 2.

SURVEY OF CURRENT COUNSELOR PRACTICES: IMPLICATIONS FOR DESIGN

I. OBJECTIVES

Before we began work on the design of a man-machine system, we made a survey of current counseling practices. Several needs prompted the conduct of the survey. One was that the study would be conducted at a single school site and would concentrate on an intensive investigation of counseling practices at that site rather than working toward the design of a general system that would be applicable to a number of field installations. A survey of practices at a sample of schools having vocational offerings would make it possible to select a site that was appropriate for the study in terms of having a wide range of counseling activity, and would give us a perspective of general counseling practices. Moreover, the survey would give the research staff initial experience in analyzing counselor functions and information processing procedures within diversified school settings. Counselors in different settings have different goals, and they, as professional people, decide which criteria are important to their job. Thus, in another sense, the survey would enhance the design study by defining a wide variety of problems and solutions counselors must deal with, possibly giving some clue as to the effectiveness of one mode of solution over other alternatives.

Stated more explicitly, the objectives of the survey were:

- To provide an understanding of a general counseling practice so that the design effort could be oriented to the general field as much as possible.
- To describe information processing procedures in vocational counseling.
- To provide design ideas for the experimental design.
- To view current practices in terms of expressed optimal counseling models.
- To define problems in practice.
- To use the experience gained in other counseling settings in overcoming problem areas.

II. CONDUCT OF SURVEY

A. SELECTION OF SURVEY SITES

Twelve schools were selected for the survey of vocational guidance practices with the intent that one of the sites would then be selected for the more intensive study. The scope of the survey was dictated primarily by the requirement that it be large enough to sample each of the major categories of schools offering a vocational program, without being so large as to impinge on the time demands of the main project.

With the assistance of Dr. Melvin Barlow, Division of Vocational Education, UCLA, and Dr. William John Schill, Department of Vocational-Technical Education, University of Illinois, the research staff delimited several school categories and selected schools that, in the consensus of the consultants, were good representations of both the school category and of the regional areas of the country.

The categories and the representative schools are as follows:

Comprehensive High School	Sepulveda Junior High School and Monroe High School Sepulveda, California George Washington High School Cedar Rapids, Iowa
Technical High School	Benson Polytechnic High School Portland, Oregon
Vocational High Schools	Connecticut Vocational High Schools at Hartford, Hamden, and New Britain, Connecticut
Area Vocational School	South Carolina Area Trade School
Vocational-Technical School	Milwaukee Adult, Vocational, Technical School Milwaukee, Wisconsin
Technology Institute	Oklahoma State University School of Technical Training Okmulgie, Oklahoma

Junior College	Large	Los Angeles Trade-Technical College Los Angeles, California
		Long Beach City College Long Beach, California
		State University of New York at Farmingdale Farmingdale, New York
	Small	Laney College Oakland, California
		Porterville College Porterville, California

B. DATA COLLECTION INSTRUMENTS

The selection of measures for the survey was dictated by the need to determine the duties of counselors and the factors that contributed to the counselors' functions and activities within the diverse school settings.

The basic instrument used to collect data on counselor activities was a modified version of the Q-technique. The modification made to the instrument was sufficiently comprehensive to warrant calling it a card sort.

Based on a review of the current literature in counseling and guidance, we produced a group of cards representing the possible activities that counselors engage in, one activity per card. The description of each activity was sufficiently comprehensive to insure that the response would be to the activity itself rather than the method of carrying out the activity. We then inspected the cards, to remove redundant items, to insure coverage of all possible activities, and to modify overlapping items so that each activity was unique. This resulted in a total of 36 activities, which were typed on three-by-five cards. Two pilot studies were initiated to assure the coverage of the interview items and the activity items, and to arrive at a sorting procedure that would permit the desired type of analysis.

The pilot studies were held at Emily Griffith Opportunity School, Denver, Colorado, and Santa Monica City College, Santa Monica, California. The schools were selected with specific purposes in mind. Emily Griffith has a broad range of curricula to meet the needs of students from high school age through retirement. For the pilot study, it was felt that the counselors in such a school could severely test the scope and depth of the instruments.[1]

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[1] The authors gratefully acknowledge the assistance of Miss Frankie Waits, Public Information Representative, Emily Griffith Opportunity School.

City College was chosen because of its close proximity to SDC and the fact that it has both a large academic and vocational program, the students of which are all counseled by the same staff. Again, it provides an opportunity to sample a large range of activities.

The counselors at each of the schools were asked to inspect the cards for coverage and identify (1) areas in which cards were lacking, (2) contradictory or overlapping descriptions, and (3) the accuracy of each statement and its understandability. By this means changes and modifications were made, and 12 additional items were added, expanding the total to 48 which were deemed sufficiently comprehensive to sample the range of counseling activities. (See Appendix A).

Another contribution of the pilot studies was to modify the directions for the card sort. Originally, it had been planned to have the counselors sort the cards in terms of the effort they were presently spending on each of the activities. However, the reactions of the counselors during the pilot study indicated that often they were spending much effort on activities that they would prefer to have done by someone else. Consequently, there are activities that they would like to do which they do not have time for under the present system. It was decided, therefore, to have them make an additional sort in terms of the activities they would like to spend their effort on, given a situation with no restrictions and with unlimited resources.

Additionally, an interview format was designed to elicit descriptive information for insight into the factors that could be presumed to have an influence on the counselors' functions and activities. The lack of standardized training procedures and certification procedures among the states makes it difficult to define the range of duties a counselor may be assigned within the school system. At another level, the size, functions, and organization of the school dictate, to a large degree, the objectives and activities of the counselors within the school.

The interview was designed with two formats, one to be answered by the person most directly responsible for the administration of the counseling organization, and the other to be answered by each of the individual counselors. The former contained items relating to a description of the faculty, areas of instruction, characteristics of the counseling staff, characteristics of the student body, testing procedures, placement and follow-up procedures, the general counseling procedures followed by the counseling staff as a whole, and the data processing procedures of the school. The latter contained items relating to the educational and occupational history of the counselors, their counseling load, the referral processes of the school, the outside sources to which they referred students their individual counseling procedures, their opinions on inefficient procedures within the organization and ways in which computer technology might enhance these procedures. (See Appendix B.)

C. DATA COLLECTION PROCEDURES

We contacted each of the schools included in the surveys by mail to explain the nature of the survey and to solicit their cooperation in the data collection. A brief account of the nature of the study was included with each letter. Contact was through the head counselor or head of student personnel services. A telephone contact followed the school's letter of response, to arrange certain details--mainly, to define the amount of time required by the counseling personnel and to set an interview date that was mutually convenient for the research personnel and the counselors. All but one school--whose school district was having difficulties--agreed to participate. That school was replaced by another in the same category.

At the school, we first described the overall study in greater detail to the head of the counseling service, who often invited other administrative personnel from the school to sit in on this discussion. Their attendance often stemmed from their concern that the computer was going to be used to automate the entire counseling operation. A discussion of how the machine could enhance the counselor's work, along with concrete examples of how it could help them with problems they brought up in the discussion, dispelled most of these fears. This discussion enhanced the interview process tremendously, and encouraged them to respond to the open-ended questions regarding their procedures and the problems they were encountering; and even to take the interviewers on tours of the school. They were then able to convey their support to their staff who likewise appeared comfortable and willing to participate freely in the individual interview and card-sort.

The counselors were all given a brief overview of the project and told that the purpose of the survey was to serve in enhancing the design phase of the development study. Following the interview, the card sort was administered. The counselors were first instructed to look through the 48 cards and sort them into three piles, in terms of the effort they spent on the activities: "most effort," "some effort," "no effort." The latter group of cards was then eliminated from further consideration and the activities requiring "most effort," and "some effort" were forced into the left hand tail of a normal distribution. (See Appendix C.) Following the forced sort, the counselors were instructed to go through the cards again, only this time to sort them into three piles in terms of the effort they would like to spend on each of the activities according to their individual counseling objectives. They were requested to do this in terms of an ideal counseling arrangement where they had no restrictions on resources or procedures. Again, the cards in the "most effort" and "some effort" categories were forced into the left hand tail of a normal distribution.

D. ANALYSIS OF THE DATA

The survey involved 12 schools (Sepulveda Junior High School was included when the decision to conduct the study in Los Angeles was made) with a total of 57 counselors. The sample size in this case is much too small for any sophisticated statistical analysis. The number of variables and their interaction effects is greater than the total N, making prediction literally impossible. The reader is cautioned that the results of the analysis are intended to be of a descriptive rather than an inferential nature.

The following table (2-1) gives a frame of reference for the sample of counselors under consideration.

Table 2-1. Number of Counselors Interviewed by School

Type	School	No. Counselors Interviewed
Post-Secondary	Farmingdale	8
	Long Beach City College	11
	Laney College	6
	Porterville College	6
	Los Angeles Trade-Technical College	7
	Oklahoma State Technical College	3
	South Carolina Area Trade School	1
	Milwaukee Technical, Vocational, Adult School	14
TOTAL		56
High Schools	Benson Polytechnic High School	8
	Connecticut Vocational High Schools	3
	George Washington High School	6
	Monroe High School	9
	Sepulveda Junior High School	5
TOTAL		31

The schools which were selected to represent different categories of educational settings have a somewhat different curriculum corresponding to their different objectives; we thus hypothesized that differences would also exist among the personnel employed at each of these schools.

We analyzed the personal variables of the counselors, to isolate those variables or combinations of variables that have an effect upon the responses to the card sort. This would permit a logical and systematic analysis of the activities functionally related to a variety of counseling operations, regardless of the school type. The personal data variables utilized from the interview format are: school, type of school (secondary or postsecondary), sex, age, educational attainment, years of counseling experience, years of experience in education, years of experience outside the educational system, salary, major counseling function, credential status.

Frequency distributions were run on each of these variables. The data for each variable were then categorized into appropriate groupings and all possible interaction effects were analyzed via cross-tabulation analysis. Fifty-six counselors, or 64 percent, were from postsecondary schools; the remaining 31 being from secondary schools. Of the total group, 25 (28.7 percent) were female and 62 (71.3 percent) were male. Their ages ranged from 24 to 67, as presented in Table 2-2.

Table 2-2. Age

Years	Number of Counselors	Percent
65-69	2	2.30
60-64	1	1.15
55-59	6	6.90
50-54	12	13.79
45-49	19	21.84
40-44	18	20.69
35-39	12	13.79
30-34	13	14.94
25-29	3	3.45
20-24	1	1.15
Total	87	
Mean	43.26437	
Std. Dev.	9.09314	

1. Educational Attainment

Educational attainment was broken down into four categories for the analysis: baccalaureate degree, master's degree, beyond a master's degree but less than a doctoral degree, and doctoral degree. The totals for each category are presented in Table 2-3. The larger percentage who are in the group beyond the master's degree may be explained by the fact that many of the counselors entered the area through the teaching route and are now working on pupil personnel credentials. Also, a number of these people, once in counseling, have decided to pursue a doctoral degree.

Table 2-3. Education Attainment

	Group 2	
Level	Number of Counselors	Percent
Ph.D.	4	4.60
Beyond M.A.	34	39.08
M.A.	40	45.98
B.A.	9	10.34
Total	87	

2. Years of Experience in Counseling, Education, and Outside Experience

The counselors in the survey vary greatly with respect to years of experience in counseling, education, and industry. (See Tables 2-4, 2-5, and 2-6.) The values shown in these tables were obtained by differentiating the jobs in the occupational history of each counselor into the three categories. This history included all full-time jobs held by the respondent since high school. Length of time on the job was recorded in months, as well as the major job functions, and the reason for leaving the job. It was originally intended to discern if the respondent's career pattern in terms of route, stability, and mobility could cast light on the respondent's perception of the job. The small sample size, coupled with the large interaction effects of the other variables, made this infeasible within the scope of the survey.

What is apparent from analyzing the cross-tabulation interactions among years of experience is that there are no interactions between time in one type of experience and the experience one would have in another area. However, there was an interaction effect between age and experience in both counseling and education, as well as between educational attainment and years of counseling experience. These interactions are tabulated in Tables 2-7, 2-8, and 2-9.

Table 2-4. Years of Counseling Experience

Years	Number of Counselors	Percent
22-23	2	2.30
20-21	2	2.30
18-19	2	2.30
16-17	2	2.30
14-15	4	4.60
12-13	4	4.60
10-11	6	6.90
8-9	5	5.75
6-7	12	13.79
4-5	14	16.09
2-3	18	20.69
0-1	16	18.39
Total	87	
Mean	6.5	
Std. Dev.	5.6	

Table 2-5. Years of Education Experience

Years	Number of Counselors	Percent
40-44	1	1.15
35-39	1	1.15
30-34	0	0.
25-29	0	0.
20-24	5	5.75
15-19	8	9.20
10-14	16	18.39
5-9	32	36.78
0-4	24	27.59
Total	87	
Mean	8.9	
Std. Dev.	7.4	

Table 2-6. Years of Outside Experience

Years	Number of Counselors	Percent
24-25	1	1.15
22-23	0	0.
20-21	0	0.
18-19	1	1.15
16-17	1	1.15
14-15	1	1.15
12-13	4	4.60
10-11	4	4.60
8-9	7	8.05
6-7	11	12.64
4-5	13	14.94
2-3	23	26.44
0-1	21	24.14
Total	87	
Mean	4.8	
Std. Dev.	4.7	

Table 2-7. Cross-Tabulation Between Age and Years of Counseling Experience

		Age (Years)					
		20-29	30-39	40-49	50-59	60-69	
Experience in Counseling (Years)	1-4	4	16	16	6	0	42
	5-9	0	8	12	2	1	23
	10+	0	1	9	10	2	22
		4	25	37	18	3	87

Table 2-8. Cross-Tabulation Between Age and Years of Experience in Education

		Age (Years)					
		20-29	30-39	40-49	50-59	60-69	
Experience in Education (Years)	0-4	4	10	7	3	0	24
	5-9	0	15	11	6	0	32
	10+	0	0	19	9	3	31
		4	25	37	18	3	87

Table 2-9. Cross-Tabulation Between Age and Years of Counseling Experience

		Educational Attainment				
		B.A.	M.A.	M.A.+	Ph.D.	
Counseling Experience (Years)	1-4	6	20	16	0	42
	5-9	0	15	8	0	23
	10+	3	5	10	4	22
		9	40	34	4	87

The counselors between age 30-39 had fewer years of counseling experience than anticipated. This would seem to indicate that they entered counseling via the teaching or business route.

The counselors in the younger age group (20-29) all have the least experience in education. Coupled with the above observation, this would indicate that the younger people have the least experience in education as well as in counseling. At the other end of the scale, the counselors in the 60-69 age group had a larger frequency in the 10-years-and-beyond category.

Counseling experience was also related to educational attainment; again, those counselors with more experience generally attained a higher educational level.

Outside experience was not related to any of the variables. One school, Los Angeles Trade-Technical College, did have a proportionately greater number of counselors with more than 10 years outside experience. This is understandable, as vocational credentials carry the stipulation of industrial experience.

When years of experience in education was cross-tabulated with educational attainment, a greater than expected frequency of counselors having B.A.'s and Ph.D.'s also had more than 10 years outside experience. This may be attributed to the fact that counselors entering the field with a vocational credential would likely have only a Bachelor's degree but several years of outside experience, while those with several years of outside experience unaffiliated with vocational education per se would have earned a doctoral degree while pursuing their occupational endeavors.

3. Salary

The respondent was requested to indicate his salary for each full-time job he had held since high school, including present position (see Table 2-10). A salary code card was constructed with increments of $1,000 from $4,000 to $15,000+ annual salary, each of the values having a code number. We felt that this procedure would put the respondents more at ease about divulging information that could reflect their status position within the job.

Table 2-10 also gives a summary of the salaries of the 87 counselors, the mean salary being between 10 and 11 thousand dollars per year. A relation was observed between salary and school, age, and years of counseling experience.

Additionally, there appears to be an interaction effect between these three variables. The schools having more people employed at a low salary scale are also those with the greater number of people in the younger age categories and, thus, with the least counseling experience. The reverse situation also exists, with The State University of New York at Farmingdale having a large number of counselors in the low salary categories. This might be attributed to the fact that they are expanding the counseling service and have recently employed several new people with little previous counseling experience. Milwaukee Adult

Table 2-10. Annual Salary

Salary Code No.	Salary	Number	Percent
01	under 4000	0	0.
02	4001 - 5000	0	0.
03	5001 - 6000	1	1.15
04	6001 - 7000	3	3.45
05	7001 - 8000	7	8.05
06	8001 - 9000	11	12.64
07	9001 - 10,000	17	19.54
08	10,001 - 11,000	21	24.14
09	11,001 - 12,000	18	20.69
10	12,001 - 13,000	5	5.75
11	13,001 - 14,000	3	3.45
12	14,001 - 15,000	0	0.
13	15,001 and above	1	1.15
		Total 87	

Vocational and Technical School, on the other hand, has less than the expected number of people in the lower salary categories. This may be attributed to the fact that their staff, in general, has a higher median age and many years of counseling experience.

4. Major Counseling Functions

Of considerable interest to the survey was whether differences could be discerned in the response to the card sort due to a counselor's particular area of responsibility. On the basis of each counselor's functions, and comments on his present job obtained during the interview, we compiled six major categories of functions.

Table 2-11 presents the number of counselors falling in each of the categories. Categor I refers to those counselors that are primarily responsible for personal, emotional, and psychological problems of the counselee. Category II refers to counselors who handle a specific student group, i.e., foreign students, American Indian students, etc. Category III denotes those that are primarily concerned with educational and vocational planning. Included in this group are instructor counselors, i.e., counselors responsible for a specific major curriculum area; and class counselors, i.e., counselors responsible for a particular class. Category IV contains those counselors whose major function is placement and testing. Category V includes counselors whose main function is admissions and recruitment counseling, and Category VI contains those with primarily administrative and/or discipline functions.

Table 2-11. Major Counselor Functions

Category	Number	Percent
I. Personal, Emotional, Psychological	5	5.75
II. Special Types	10	11.49
III. Educational and Vocational Planning, i.e. Instructor Counseling Class Counseling	49	56.32
IV. Placement, Testing	7	8.05
V. Admissions and Recruitment	6	6.90
VI. Administrative and Disciplinary	10	11.49
Total	87	

We related counseling function to specific school and to the counselors' educational attainment, with the following findings. A large number of the student personnel counselors at the State University of New York were in the admissions and recruitment category, where the counselors visit the high schools and are the primary people the student sees when he applies for admission and selects a major. In the Connecticut Vocational School, a large percentage of the counselors' time is also spent recruiting students from the 8th or 9th grades in the local areas.

The School of Technical Training in Oklahoma has a preponderance of counselors in Category II; special counselors responsible for Indian students, and veterans. The greatest number of counselors at Laney College are in personal, emotional, and psychological counseling.

Inspection of the cross-tabulation matrices also indicated a relationship between educational attainment and counseling function. Counselors with a master's degree were generally in Category IV, placement and testing. Those having gone beyond the master's degree were more likely to be found in administration and in personal, emotional, and psychological counseling.

No relationship was indicated between counseling function and the other variables. However, the relationship between particular categories and counseling function is worthy of discussion. High schools had greater numbers of counselors in educational and vocational planning, with less concern for specific student groups and personal, emotional, and psychological cases. Post-high-schools had a greater number of counselors dealing with specific student groups.

Counselors handling specific student groups were more likely to be female, and they were also more likely to be in the age group 20-29.

Counselors having 0-4 years experience tended to be in the category "Admissions and Recruiting"; those having 5-9 years experience, in the administration and disciplinary category; and those with greater than 10 years, in the personal, emotional, and psychological category.

Counselors with greater than ten years experience outside the school system also tended to be in personal, emotional, and psychological counseling.

5. Credential Status

Credential status was the last variable to be investigated. A counselor was considered credentialed if he had obtained any certificate attesting that he had met the requirements in counseling specified by a recognized credentialing agency.

Of the schools surveyed, all but one had some credentialed people on their staff. George Washington High School, Long Beach City College, and Laney College had all credentialed people. The general indication was that schools with a primary vocational education emphasis were more apt to have more noncredentialed than credentialed counselors, while the reverse was true for schools having a broader scope of program offerings.

Table 2-12 indicates the credential status of the counselors in the survey. Cross-tabulating credential status with the other personal data variables indicated that credential status was related to school, age, educational attainment, years of counseling experience, and salary.

Table 2-12. Credential Status

	Number	Percent
No	38	43.68
Yes	49	56.32
Total	87	

The major interaction between credential status and age came from the middle-aged to older counselors. A smaller number of counselors between 40-49 years were noncredentialed. For the group 60-69, a greater number were noncredentialed than credentialed.

The relationship between credential status and educational attainment was largely distinguished at two levels. The people with a bachelor's degree had a greater than expected frequency in the category "noncredentialed." The categories were equivalent at the master's degree and then beyond the master's degree, a reversal trend emerged and these counselors had a greater than expected frequency in the credential category.

Credential status and years of counseling experience indicated a similar relational trend. Counselors with 0-4 years of counseling experience were less apt to be credentialed while those with over 10 years experience had a higher frequency in the credentialed category.

Credential status was also related to salary. Noncredentialed personnel had larger than expected frequencies in the lower salary range while credentialed personnel were more likely to be in the higher salary range.

Table 2-13 gives a summary of the preceding cross-tabulation analyses. Indicated trends are as noted. The analysis of the personal data variables obtained from the interview data forms the basis for the subsequent card-sort analysis.

Table 2-13. Indication of Interactions Between Variables Identified Via Counselor Interviews

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
School ID	(1)									*	*	*
School Type	(2)											
Sex	(3)											
Age	(4)						*	*		*		*
Ed. Attainment	(5)						*				*	*
Counseling Exp.	(6)									*		*
Ed. Experience	(7)											
Outside Exp.	(8)											
Salary	(9)											*
Counselor Type	(10)											
Credential	(11)											

B. THE CARD-SORT ANALYSIS

The use of the card sort technique in the interviewing process to solicit the respondent's opinion regarding the kinds of activities related to his present position (Actual Sort) and the activities in which he would like to spend his effort (Ideal Sort) is a rather unique application of this technique. The Q-technique has been used by Shelton and Sorenson[2] and others as an assessment of group opinion; however, in this application the materials covered do not form a single continuum but are a composite of a variety of counseling activities and, as a consequence, the analysis is not the typical Q-correlation analysis.

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[2] Shelton, M. S. and Sorenson, A. G. On the use of Q-technique in education evaluation and research. System Development Corporation, Santa Monica, California. SP-135, 11 December 1959.

The technique of having individuals respond to cards has a number of advantages over the rating form that is more typically used in a study of this kind.[3] The most obvious advantages are (1) the opportunity to compare all of the items on the cards with each other in the process of responding, and (2) to make assessments of the relatedness of the material without committing oneself to a given response as would be the case in a rating scale. This permits further modifications and adjustments as the respondent proceeds through the process. It is not until the respondent is totally satisfied with the distribution of the cards that he commits himself.

The original concept of using a card sort for defining the activities functionally related to the amount of effort in a variety of counseling settings remains valid. However, because of the scope of the counseling settings covered in the survey, there was a need to modify some of the basic techniques in the card sort. In order to cover the wide variety of activities which could conceivably be applicable to the various counseling settings included on the survey, the number of cards that were totally unrelated to any one counselor's function was equal to approximately 18 of the 48 cards on the actual sort and 15 of the 48 cards on the ideal sort. This made it impossible for the respondents to distribute the unrelated cards in the right hand tail of the forced sort in a meaningful fashion since all were equally and totally unrelated.

In a typical card sort the respondent goes through the cards once and sorts them roughly into two or more categories to get some acquaintance with the card content (rough sort). The rough sort is followed by a forced sort where the respondent sorts the cards into a quasi-normal distribution. In the modified version of the card sort used in the survey, the respondent initially sorted the cards into three categories--"most effort," "some effort," "no effort"--the rough sort. These were recorded prior to the following forced sort (see Form 1, Appendix C). On the forced sort, the respondent was asked to distribute the "most effort" and "some effort" cards into the left-hand tail of the forced distribution, and to inspect the unrelated pile to be sure no functionally related or somewhat related card had been overlooked. In recognition of the total unrelatedness of the third category of cards in the unforced sort, i.e., those in the "no effort" category, they were treated as being equal and were not forced into the normal distribution (see Form 2 in Appendix C). This was the major modification made to the sorting procedure used in a typical Q-sort.

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[3] Schill, W. J. Curriculum Content for Technical Education, University of Illinois, USOE Final Report #2042, 1964, p. 32.

As a consequence of this modification in the card sort, the typical Q-sort correlational analysis was not fitting because of the lack of normal distribution, the distribution having been consistently and greatly skewed to the left.

To measure the extent of agreement on the items in the card sort among the various groups conceived to have a possible confounding effect upon the card sort, the coefficient of concordance was used. This technique was used by Schill in defining the curriculum content functionally related to occupational needs in a variety of technologies with considerable success.[4]

Values ranging from 7 through 0 were assigned to the responses, with value 7 assigned to the first category in the left-hand tail of the forced sort in which there were three cards; value 6 assigned to the second category in which there were six cards; value 5 assigned to the third category in which there were nine cards; value 4 assigned to the fourth category in which there were 12 cards; etc., to value 1 being assigned to the last category in which there were three cards. Not all respondents had this many cards functionally related to their job, so at the point where the cards denoting "some effort" were exhausted, positive values ceased to be assigned and whatever cards were left over were given a value of zero. When the value assigned each card was summed across all of the respondents, the resulting range of total values was from 51 to 518 on the actual sort, and 32 to 550 on the ideal sort.

The coefficient of concordance was computed among the 87 counselors on the actual sort with the following results:

$W = .414 \quad K = 87 \quad N = 48 \quad \chi^2 = 1696 \quad P < .01$

The coefficient of concordance among 87 counselors on the ideal sort had the following results:

$W = .361 \quad K = 87 \quad W = 48 \quad \chi^2 = 1476 \quad P < .01$

The coefficient of concordance between the actual sort versus the ideal sort had the following results:

$W = .859 \quad K = 2 \quad N = 48 \quad \chi^2 = 80.780 \quad P < .01$

The coefficients of concordance listed above demonstrate the strong central agreement on the placement of the activities across all persons.

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[4] *Ibid.*, pp. 33-34, 78-84.

The highly significant coefficient of concordance does not imply that the respondents agreed on the placement of every item. Inspection of the rank orders indicates that there was strong central agreement on the top end of the rank order. The procedure used to identify those items that contributed most to the significant coefficient of concordance was to delete from further analysis those items at the top on which there was strong central agreement and place them in the category of activities required by all counselors, regardless of school setting. These items were card numbers 1, 2, 3, 4, 6, 11, 27, and 32.

Very generally, these eight items, differentiated by the total group of counselors as being activities that are presently taking their major effort and on which they would continue to place most effort, given an ideal counseling situation, might be viewed as the core of personal, educational, and vocational counseling as it exists, and as counselors feel it should exist, given any counseling situation:

- Help student explore his problems, feelings, and possible courses of action in an individual interview with counselor . . . . (2)
- Assist student in course planning and/or programming. . . . . (3)
    - Identify usable skills, aptitudes and interests of individuals . . . . (4)
    - Help prospective students determine their areas of strength and weakness, possibly recommending enrollment in remedial classes where necessary . . . . (6)
    - Report and/or discuss test results with students . . .(27)
- Help students make decisions about occupational goals . . . . (1)
    - Refer student to and/or discuss occupational information. . . . .(32)
- Discuss problem cases with other people on the counseling staff . . . .(11)

The analysis was run again to determine if the agreement among respondents on the placement of the activities would drop below the one-percent level of confidence when the above activities were deleted from the analysis.

The coefficient of concordance for all counselors on the actual sort was as follows:

$W = .203 \quad K = 57 \quad N = 40 \quad \chi^2 = 377.79 \quad P < .01$

The coefficient of concordance for all counselors on the ideal sort was as follows:

$W = .239 \quad K = 79 \quad N = 40 \quad \chi^2 = 736.169 \quad P < .01$

The coefficient of concordance for the actual sort versus the ideal sort was as follows:

$W = .795 \quad K = 79 \quad N = 40 \quad \chi^2 = 62.039 \quad P > .01$

With these items deleted from the analysis, a lack of agreement was indicated between what counselors are presently doing, and what they would like to do. Table 2-16 presents the basis for the following indications.

As a group, they would like to decrease the time spent on activities 7, 10, 13, 16, 18, 19, 20, 23, 31, 43, and 46. These items cover clerical routine duties such as test administration, scoring and recording; recording notes and report writing; handling registration, schedule changes, program requests and transcripts; establishing cutoff scores for acceptance of students, as well as collecting and maintaining occupational information. Additionally, they would prefer to reduce the time spent on information-giving tasks such as advising students and giving talks, including talks related to articulation problems and procedures to either students in the school or outside groups of people.

On the other hand, they would prefer to increase the time spent on activities 9, 10, 12, 17, 21, 26, 29, 34, 38, 39, 40, and 42. Primarily, they are concerned with increasing their contact with more students to work on problems of a counseling nature through the use of group counseling techniques and counseling "clinics." As a group, they would also like to increase their contact with outside agencies, where appropriate, for the solution of particular student problems. To a lesser degree, they would like to conduct research and follow-up studies to gain information about the relationship between student information and performance, as well as making contacts with industry regarding curriculum planning. Additionally, they would like to consult with administrators regarding the implications these data might have for curriculum planning and development. The use of electronic data processing equipment and techniques for processing student information is also included in this group, presumably to reduce the time taken by clerical and information-giving activities and to increase the likelihood of spending more time with students.

The remaining items did not demonstrate any appreciable shift in their placement on either the actual or ideal sort.

Items 3, 8, 24, 25, 28, 37, and 45 might be viewed as ancillary to fulfilling the activities given highest counseling priority. They include keeping track of student performance, helping students select courses they will be successful in, and helping students solve problems of a disciplinary nature; meeting with teachers to give them information about their students; consulting with the student's family; and attending staff meetings to plan and consult on the counseling program.

Table 2-14. Analysis of Responses on 48 Items of the Card Sort (N = 87)

Activity Number	Actual Sort Mean	Actual Sort Rank Order	Ideal Sort Mean	Ideal Sort Rank Order
1	5.7	46	5.7	45
2	6.0	48	6.3	48
3	5.8	47	5.1	44
4	5.3	43.5	5.7	46
5	4.8	39	4.3	37
6	5.4	45	5.7	47
7	4.6	35	3.3	24
8	3.6	32	3.8	32
9	3.0	24.5	4.9	41.5
10	3.4	33	4.6	37
11	5.0	43	4.9	41.5
12	3.7	30	4.5	35
13	2.9	22	4.3	33
14	5.5	42	1.4	3
15	2.4	16	1.1	2
16	1.3	8	1.3	6
17	0.7	2	2.3	27
18	1.3	11	0.4	1
19	1.6	21	2.0	9.5
20	2.5	26	2.0	8.5
21	2.8	21	2.7	29.5
22	3.4	29	2.7	29.5
23	4.8	13	1.7	6
24	4.8	28	4.9	40
25	2.9	34	4.4	38
26	2.8	20	3.4	28
27	2.3	43.5	4.9	43
28	2.8	25	3.9	34
29	2.4	17	2.3	29
30	3.6	19	2.3	16
31	2.4	18	2.2	13
32	3.0	41	4.0	39
33	1.0	7	1.8	7
34	2.6	4	2.0	10
35	1.0	6.5	1.4	4
36	2.3	17.5	2.8	21
37	4.1	25	4.0	23
38	1.0	4	2.8	22
39	1.4	9	2.1	20
40	0.9	3	2.7	19
41	1.0	6.5	2.0	12

Table 2-14. (Cont'd)

Activity Number	Actual Sort		Ideal Sort	
	Mean	Rank Order	Mean	Rank Order
42	2.0	14	3.2	25
43	2.5	19	2.1	11
44	3.0	24.5	2.8	18
45	4.7	37	3.9	33
46	3.1	27	3.3	27
47	2.5	17.5	2.6	16
48	2.9	23	3.3	26

Of lesser priority were items 13, 22, 36, 46, and 48. These include helping students obtain scholarships and make financial arrangements to stay in school; establishing relationships between anecdotal data and student performance; assisting agencies and groups that deal with the vocational problems of particular student groups; observing economic trends that reflect approaches to the counseling and educational program; and participating in in-service training.

Of least priority were items 10, 23, 35, and 41. These all concerned vocational planning and placement: contacting industrial sources to obtain occupational information; inviting people to participate in "career days" and finding out about placement opportunities; sending students to interview for job openings; and conducting job analyses.

With the same eight items deleted, the analysis was run again for each of the personal data variables to determine whether any of them contributed to a difference in the placement of the cards indicated by the entire sample.

Categorizing each of the variables in the same manner discussed in the previous section, the coefficient of concordance was computed for the actual and ideal sort.

The result of this analysis was that school, sex, age, educational attainment, years of educational experience, counselor function, and salary all yielded a sufficiently high agreement among the categories of each variable to be significant at the one-percent level.

There were three variables that differentiated the respondent's agreement on the placement of the activities. These are shown below with the computed statistics.

Years of counseling experience on the actual sort:

$W = .773 \qquad k = [illegible] \qquad N = 40 \qquad \chi^2 = 60.297 \qquad p > .01$

Years of counseling experience on the ideal sort:

$W = .777 \qquad k = [illegible] \qquad N = 40 \qquad \chi^2 = 55.173 \qquad p > .01$

Years of experience outside education on the actual sort:

$W = .775 \qquad k = [illegible] \qquad N = 40 \qquad \chi^2 = 61.048 \qquad p > .01$

Years of experience outside education on the ideal sort:

$W = .736 \qquad k = [illegible] \qquad N = 40 \qquad \chi^2 = 57.473 \qquad p > .01$

Credential status on the ideal sort:

$W = .750 \qquad k = [illegible] \qquad N = 40 \qquad \chi^2 = 61.304 \qquad p > .01$

The rank ordering of the 40 activities was inspected for each of the categories initially employed for analyzing years of counseling experience, years of experience outside of education, and credential experience on both the actual and ideal sort.

Of particular interest in this analysis was whether the difference in rank ordering between the actual and ideal sort for each of the categories within the particular variable would support the differences indicated by the entire sample or whether the variable was sufficiently independent to connote a unique effect on the card sort. The former finding would indicate that the activities on which counselors would prefer to either increase or decrease their time are common across counseling settings and counselor types. The value of a certain amount of generality in preference is that it then becomes possible to develop a system with some notion that the design is applicable to more than one specific site or particular type of counselor.

Tables 2-25, 2-26, and 2-27 indicate the activities on which counselors would prefer to increase or decrease their time, based on a difference of five ranks between the actual and ideal sort. The findings are presented as a comparison between the total sample and the categories within each of the three variables having a lack of agreement among counselor responses.

The findings indicate, without exception, that each of the activities placed five ranks higher or lower between the actual and ideal sort for the total sample also has a comparable difference in rank in the same direction for at least one of the categories of each variable. Additionally, between 50 to 70 percent of the items denoted by the total sample, as ones they would prefer to increase or decrease their time on, completely overlap all the counselors for a particular variable. Thus, given counselors having differing amounts of counseling or outside experience, or differing credential status, and a lack of agreement on the placement of the total group of cards, there is still agreement on the extent to which they would like to increase or decrease the time spent on a proportionate number of the cards indicated by the total group.

Thus the discrepancies between what counselors are presently doing and what they would prefer to do in an ideal situation have sufficient agreement to be generalizable among all counselors.

By no means are the above conclusions meant to imply that all counselors indicate the same activities on which they would like to increase or decrease their time. The coefficient of concordance does indicate that the amount of experience a counselor has had in counseling and outside the educational system, and his credential status, do have an effect on what he is doing and what he would like to do. It will be recalled from the analysis of the personnel data variables that there was an indicated interaction between these and other personnel data variables which might be influential in producing these findings. As such, further research into these effects, not possible with the small sample size, might ascertain the causal factors producing the lack of agreement and the effect of other interacting variables on the lack of agreement.

Table 2-13. Differences Expressed Between the Actual and Ideal Sort for Years of Counselling Experience

	Decreases	Increases
Total Sample (From Table 2-12)	7, 14, 15, 16, 18, 19, 20, 23, 31, 43, 44	9, 10, 12, 17, 21, 26, 29, 30, 32, 33, 40, 42
Yrs. of Counselling Exp.		
(All Categories)	14, 15, 18, 19, 20, 31	9, 17, 29, 32, 33, 40, 42
0-4 Yrs.	13*, 16, 43, 44	11, 21, 30, 35, 12
5-9 Yrs.	7, 23, 25, 12	1, 10, 22, 33, 27
10+ Yrs.	2, 7, 23, 25, 37	26, 22

*Underlined numbers denote the activities ranked higher or lower between the actual and ideal sort uncommon from the total sample.

Table 2-16. Differences Between Actual and Ideal Sort for Years of Outside Experience

	Decreases	Increases
Total Sample (From Table 2-10)	7, 14, 15, 16, 18, 19, 20, 23, 31, 43, 44	2, 10, 12, 17, 21, 26, 28, 34, 35, 38, 40, 42
Years of Outside Experience		
(All Categories)	7, 14, 15, 18, 20, 23*, 31, 43	12, 17, 34, 38, 40, 42
0-4 Yrs.	1, 8, 16, 19, 23, 44	2, 21, 39, 41, 42
5-9 Yrs.	[illegible]	[illegible]
10+ Yrs.	16, 22, 27, 29, 31, 44, [illegible]	[illegible]

*Underlined numbers denote the activities ranked higher or lower between the actual and ideal sort uncommon from the total sample.

Table 2-17. Differences Expressed Between the Actual and Ideal Sort Based on Credential Status

	Decreases	Increases
Total Sample (from Table 2-16)	7, 10, 12, 16, 18, 19, 40, 43, 51, 53, 66	9, 11, 14, 17, 31, 36, 42, 50, 58, 59, 61, 64
Credential Status (Both Categories)	7, 10, 12, 18, 19, 40, 51, 66	9, 11, 14, 17, 33, 50, 58, 59, 61, 62, 64
Credentialed	5*, 16, 43	11, 22, 23, 46
Noncredentialed	15, 25, 43, 46	41, 42, 46, 52, 56, 57

*Underlined numbers denote the activities ranked higher or lower between the actual and ideal sort uncommon from the total sample.

III. SUMMARY

Up to this point, the information contained in this chapter has been intended to be purely descriptive. Primarily, the data contained in this chapter gave the researchers added insight into what is going on in the counseling community, giving us some basis for selecting a school in which to design a man-machine counseling system and giving focus to the design of the system.

Due to the nature of USOE's concern in funding the study, namely, their desire to improve vocational counseling in the schools, particular attention was focused on this aspect of counseling at the different school sites.

Consistently it was noted that the bulk of what might be termed vocational counseling existed at the postsecondary level. It was here that students were interviewed with the specific intent to help them select an occupation, get them placed in a job, and follow up their progress so that the curriculum might be modified to keep it abreast of changes going on in the world of work. However, in schools where these activities did occur, it appeared that the student had already selected a course sequence and the attempt to counsel was mainly geared to helping him select a particular niche within the broader occupational area. In many cases, the desire to change areas would delay the student's graduation, as there was often little carryover of courses between different curriculum content, even those closely related in terms of job content.

It was with this point in mind that the final decision of selecting a school was made. At the postsecondary school, students were already somewhat committed to their present choice and any change in procedures would necessitate restructuring the entire school organization. Thus, it was assumed that the place to really improve vocational counseling was at the secondary level.

Additionally, analysis of the card sort data indicates that there are no significant differences between one site and another in the kinds of responses as a whole. However, the data do indicate a marked difference between what counselors are doing and what they would like to do: As a group they would prefer to reduce greatly the amount of time that they must devote to routine information processing tasks such as registration, schedule changes, program requests, analysis of routine data, recording of data, report writing, collecting and updating occupational information and test administration. They would prefer to be able to increase the time they devote to working with students in such activities as "helping students, through group and individual counseling, to explore their problems, feelings, and courses of action." They would like more time for following up their students, working with administrators in improving curricula to meet the needs of students, and conducting research. They would like to see an increase in the use of data processing equipment, presumably to lift the information-processing task from their shoulders.

The findings from the survey support our belief that counselors are forced to spend too much time with information-processing chores; that, ideally, they would like to change their activities in the humanistic direction of working more with students directly or indirectly; and that they would like to alter the system to better meet the needs of the students.

CHAPTER 3.

SYSTEM ANALYSIS OF COUNSELING FUNCTIONS AT MONROE HIGH SCHOOL AND SEPULVEDA JUNIOR HIGH SCHOOL

I. PURPOSE AND PROCEDURE

The primary purpose of the system analysis was to provide the SDC research team with a detailed understanding of the current counseling operation. Another objective of the analysis was to facilitate the counselors' awareness of their own procedures. We assumed that they would increase their awareness by describing their job to the research members and by discussing their descriptions openly with the other counselors.

We collected data for the system analysis by interviewing each of the counselors at the high school and the junior high school. The head counselors at the two schools were asked to describe the general characteristics of the schools and the general procedures employed in the counseling operation. Each staff counselor was asked to describe in detail the procedures that he employed in carrying out his job.

Each interview lasted several hours. In several cases additional interviews were required to clear up misunderstandings and to obtain additional information.

The descriptions were studied by the research team. The different descriptions were studied for similarity and overlap. Following the analysis of the descriptions, the research team prepared large visual displays of the results of the analysis for feedback to the counselors. These displays were actually lists of the counselors' functions presented in black and red grease pencil on large 20" x 30" display paper.

The research team met with the two groups of counselors (the senior high and the junior high counselors) separately for the feedback sessions.

The displays were placed on the wall where everyone could see and discuss them. Two primary objectives were achieved in the feedback sessions. Misconceptions, omissions, and misunderstandings were clarified and appropriate corrections were made in the descriptions, and the research staff obtained an agreed-upon description of the counselors' objectives.

Toward the end of the feedback session, each counselor was asked to list the major problems in counseling. This provided additional data for the analysis and helped to prepare the counselor for the design meetings by focusing their attention on problems.

The feedback session was the first opportunity that the counselors ever had to communicate with each other openly and in detail about their job and their objectives. They reacted to this opportunity enthusiastically, and felt that they became much more keenly aware of their own jobs and of what their colleagues were doing. This open, shared communication about the counseling operation provided an excellent springboard for the design meetings discussed in Chapter 4.

II. RESULTS OF THE SYSTEM ANALYSIS

The results from the two schools are discussed separately.

A. MONROE HIGH SCHOOL

The high school is a comprehensive high school with approximately 3600 students in grades 10 through 12. The school is located in the San Fernando Valley and the population is made up primarily of middle-income families. There are 12 counselors in the counseling office: a head counselor, 3 other full-time counselors, and 8 part-time counselors. The six counseling objectives and the functions associated with the objectives are as follows:

1. Facilitate Student Orientation and Articulation Between Junior High-Senior High, and Between Senior High-Post-Graduation Endeavors
    - Conduct orientation assembly at junior high the semester prior to B-10 registration.
    - Give out packet (welcome letters, student activity cards, dates of registration).
    - Conduct summer counseling session for students new to school district.
    - Conduct orientation to school in B10 English.
2. Assist Students in Making Decisions About Post-Graduation Plans
    - Conduct individual planning interviews at junior and senior high level.
    - Assist students to establish majors, goals.
    - Conduct 10-week guidance course for B10, A10 students.
    - Interpret test data.
    - Acquaint students with postsecondary school requirements--college, vocational, armed services.
    - Assist students to investigate available scholarships--awards, honors.

- Arrange parent conferences for purpose of clarification and consent of student's program.
- Arrange to have student participate in conferences dealing with post-high-school opportunities.

3. Make Sure Students Have Necessary Requirements for Graduation

- Handle student programming--B10, A10 English Class
  B11, A11 History Class
  B12 Government Class.
- Handle student registration.
- Ascertain students having academic difficulties--report cards, progress reports, unsatisfactory reports.
- Check and maintain student cumulative folders.
- Keep parents informed of unsatisfactory progress of student.
- Release summer school information and registration required.

4. Maintain Student Cumulative Folder

- Pupil personnel information
- Progress reports
- Senior graduation check list (B12).

5. Identify Special Student Groups--Such as Honor Classes, Underachievers-Overachievers

- Use reading test results, assign low students to special classes.
- Identify homogeneous groups.

6. Help Students with Personal Problems Such as Home, Teacher-Student Relationships, Referrals, Health, Financial Problems.

The detailed summaries of the counseling procedures for Monroe High School are presented in Appendix J. The procedures are described in calendar fashion starting with the summer and going through the spring semester.

Since one counselor has special responsibility for college advisement and scholarship coordination, the descriptions of that function are presented in Appendix K. The results of the problem descriptions are presented in Appendix L. Some of these problems are described again in Chapter 4 in relation to system design ideas.

B. SEPULVEDA JUNIOR HIGH SCHOOL

The junior high school is in the same geographical area as the senior high school. Most of the students from the junior high go on to senior high at Monroe. There are approximately 1800 students in the junior high school distributed through grades 7 through 9. There are five counselors: one head counselor, three full-time counselors, and one part-time counselor.

The nine objectives of the junior high counseling system and functions related to each objective are as follows:

1. Facilitate Articulation Between Elementary School and Junior High, Between Transfer Students and Junior High, and Between Junior High and Senior High

- Make visits to elementary schools.
- Conduct B7 orientation assemblies.
- Participate in B7 orientation tour of school.
- Write, revise, and distribute pupil handbook.
- Supply information to pupils and parents regarding homework schedules (homework assignment sheet for failing students).
- Participate in orientation assembly conducted by senior high counselors.
- Identify and recommend athletes for senior high.

2. Help Pupils Explore Educational and Vocational Areas

- Consult with English teacher about Educational Decision Unit material.
- Conduct guidance assemblies.
- Maintain occupational file in library.
- Conduct individual conferences.
- Consult with teachers regarding homeroom program.

3. Assist Pupils to Make Educational Decisions

- Consult with English teacher about Educational Decision Unit materials.
- Assist pupils in programming.

- Conduct group counseling to assist pupils make decisions about 9B algebra or math.
- Conduct individual counseling.
- Release summer school information.

4. Help Pupils Meet Behavior Standards Set by Teachers

- Recognize pupils who meet satisfactory standards of citizenship.
- Conduct individual counseling.
- Provide study area for pupils to work on their own.

5. Support Instruction by Communicating with Parents

- Invite inquiries and give information regarding marks, report cards, curriculum.

6. Assist Pupils with Severe Learning or Behavioral Problems

- Conduct case studies to identify problem.
- Conduct parent conferences; provide them with lists of different referral agencies.
- Provide pupil information to agencies.
- Collect, maintain and provide list of available tutors at local and district level.

7. Maintain Records

- Update cumulative folder.
- Identify special student groups.
- Report information on special classes, exceptional children, teachers, supervisors, etc., to school district.

8. Assist Pupils to be Self-Evaluative

- Supply progress information via report cards.
- Give out assignment sheets to failing pupils.
- Supply progress reports to pupils and parents at 5-week and 15-week period.

- Send out special report (failure) to parents.
- Supply achievement test data to teachers of Educational Decision Units.

3. Maximize Chances of Pupil Success by Preventing Problems

- Group pupils according to ability levels.
- Provide teachers with information to understand pupils.
- Identify and determine causes for underachieving pupils.
- Provide follow-up and individual counseling for low-achieving pupils.
- Encourage high-ability pupils to use their ability.
- Help pupils adjust to teachers they do not like or whose teaching methods are difficult for the pupil.
- Secure assignments for absentees.
- Recognize good achievement via certification, honors, scholarships, assemblies.

The detailed summaries of the counseling procedures for Sepulveda Junior High School are presented in Appendix I. The procedures are described in calendar fashion starting with the summer and progressing through the 20th week. The results of the problem descriptions are presented in Appendix L. These findings are integrated into the design ideas described in the next chapter.

CHAPTER 4.

TRAINING OF COUNSELORS AND THE DESIGN WORKSHOP MEETINGS

I. THE COUNSELOR TRAINING PROGRAM

Prior to conducting the design workshop, a training program for the counselors was provided. The training program was used to orient the school counselors to the study plan and to prepare them for the design specification workshops. The following objectives characterized the intent of the training sessions:

- To give school personnel the concept of a man-machine system.
- To make school personnel aware of the potential of information processing technology.
- To stimulate interest in on-line real-time applications in addition to typical data analysis applications.
- To make school personnel aware of limitations of current information processing technology.
- To provide the opportunity to clarify conceptions and misconceptions regarding computer technology.
- To reduce fear of complexity of computer technology.
- To initiate sharing of ideas regarding potential applications.

A. TRAINING SESSIONS

Three 2-hour training sessions were conducted for each of the two counseling groups at SDC. The program was as follows:

1. First Session
   a. First Hour
      - Orientation to Project
      - Definition of Man-Machine System
      - Description of System Development Process.

1. Second Hour

   - A demonstration of the Q-32 computer and two on-line information retrieval systems was provided. The on-line systems were the SDC program for retrieving information from the personnel data base and the Los Angeles Police Department program for searching arrest file data through natural language communication.

   - Discussion.

2. Second Session

   - Demonstration of the computer-based Laboratory for Automated School Systems and a program for retrieving information from the computer on-line called QUERY.

   - Discussion.

3. Third Session

   - Demonstration of Automated Counseling Interview developed at Palo Alto.

   - Review of Project Plans and System Design Concepts.

   - Discussion.

Notebooks containing the following documents were distributed:

1. Exploratory Study of Information-Processing Procedures and Computer-Based Technology in Vocational Counseling: An Introduction. SDC document SP-2330. December 21, 1965.

   Provides a very brief summary of the current man-machine counseling study.

2. Explorations in Computer-Assisted Counseling. SDC document TM-2582/100/00. August 6, 1965.

   Provides a report of work done in developing automated appraisal and automated interviewing procedures for educational planning task.

3. The Design of Man-Machine Systems in Education. SDC document SP-1256. November 10, 1965.

   Provides a definition of the concept of a man-machine system.

I. POINTS MADE IN THE STUDY

SDC personnel discussed the purpose and orientation of the study. The following points were made:

- The purpose of the project is to design a man-machine counseling system.
- The system--loosely defined at this point--includes the counseling and guidance operations at Sepulveda Junior High and Monroe High. The inputs to the system are students and the output is students with vocational educational decisions. The system also may include planning for information transfer with the post-high-school operations such as the junior colleges and the trade schools.
- Man-machine systems are systems that are planned from the point of view of maximizing the best design for achieving the task objectives, such as helping students learn to make vocational educational decisions. Questions in the design process are oriented toward maximizing the contribution of the man and the machine.
- The responsibility of the counselors will be to specify the plans for the man-machine system. Focus will be on defining the functions that the information processing technology should perform, the kinds of information that should be handled and used in the system, the roles that human counselors should play and how the men and machines should interact to perform the counseling objectives.
- Counseling objectives were discussed as a problem area and it was conceded that it is unlikely that group consensus could ever be reached by all counselors on all objectives. It was pointed out that the system could be designed to meet the objectives of each counselor. When consensus occurs the design can focus on functions of a more general nature.
- The responsibilities of the SDC research team are to collect data that provides a description of current operations at the school, to develop the programs and procedures for computer-based information processing, and to communicate project history, plans and events.
- It was pointed out that SDC was also responsible for collecting some data that could be used by USOE to evaluate the project.

II. THE DESIGN MEETINGS

One of the key problems in the counseling project was that the school counselors were supposed to be involved in the design work, that is, in designing the man-machine system. In fact, the first proposal that was submitted to USOE did not include this step and the original proposal assumed that the SDC research team would be responsible for designing and developing the system. But USOE asked SDC to resubmit the proposal with the inclusion of the idea of including the counselors in the design phase.

When the staff approached the actual job of working with the counselors in the design phase, they became concerned with the problem of how they would interact with them effectively. In discussing the problem, it was felt that if the counselors were involved in understanding the potential uses of a computer, and if they were given adequate time, they would come up with so many ideas as to how the computer could be used as an assist. It was also assumed that they would come up with ideas that the SDC research team would not have thought of because they are the ones with the real job and the need. However, the research team was afraid that in the limited amount of time the counselors might initially be hesitant and that they might feel inadequate about suggesting ideas for the computer. Another concern was that the project was oriented toward developing a man-machine system. The researchers were afraid that the counselors who were most comfortable with data and had had experience with IBM equipment would tend to dominate the design meetings and that those counselors who were most concerned with interacting with students and least concerned with data would tend to be quiet in the meetings and, eventually, that these counselors would be passively resistant to the project. In a sense, these concerns reflected a need to have maximum involvement on the part of the counselors in the design work. The research team was interested in trying to facilitate as creative an environment as possible and was also concerned with being able to enter into the design process without being responsible for creating and manipulating the work environment.

The staff decided to try the idea of using a person experienced in sensitivity training from the National Training Laboratory to facilitate the communication process. This idea was presented to the counselors for their consideration. The counselors at the high school agreed that the inclusion of the communication facilitator should be tried with the assurance that this procedure would be discontinued if it appeared to interfere with rather than facilitate the design work. The counselors from the junior high school did not agree.

Dr. Garrett Haigh of Psychological Services Associates was asked to serve as the communication facilitator. Three 3-hour work sessions were held with the high school counselors and one 12-hour marathon concluded the design work with them. Dr. Haigh was present for two of the 3-hour sessions and for the whole 12-hour marathon design session. In the first design meeting, when the communications facilitator was absent, the communication process was chaotic, to say the least. The counseling staff had the job of feeding back to the counselors the results of the systems analysis and the counselors all seemed to be talking at once or were talking in small subgroups. As a result, it was extremely difficult to get the group as a whole to focus on the job of reviewing the analysis in any effective manner. It should be pointed out here that if the counseling project staff had been less concerned about their relationship with the counselors and if they had not been trying to avoid controlling the process, they could have actively taken control of the meeting and reduced the confusion. When Dr. Haigh came to the second meeting, his major impact was to point out the fragmenting of the communication in the group, to make the group aware of its poor communication process. This quickly resulted in a change from chaos to one person speaking at a time and others listening. Throughout the whole design work, Dr. Haigh used extremely good judgment in limiting his responses to those things that would facilitate participation and communication among the members of the design team. He very skillfully avoided bringing into the center of focus apparent strong interpersonal conflicts that existed on the counseling staff. A less skilled person may have seen these conflicts as the major thing to focus on, but certainly, if those conflicts had been focused on, then the design meeting would have become more of a therapy session. Actually, the responses that Dr. Haigh made were primarily oriented toward facilitating the communication process and the participation of the group members. In this area he pointed out that the group was functioning when a number of people were speaking at once. After he called the group's attention to functioning several times, the group took over this function and reminded itself that it was beginning to function whenever this condition occurred. Consequently, in a very short time the group was cooperative in allowing one person to speak at a time.

Another focus of Dr. Haigh's attention was the participation of various members. He was very effective in getting those people who were inclined to be silent to participate in the discussion. Not only did all members of the group become active in the discussion, but also this effect has persisted with the counselors in their own staff meetings at school. The head counselor reported that ever since the design meetings, the weekly counselor staff meetings at the school have been very lively and all of the counselors are involved in the discussion.

Dr. Haigh focused on the SDC people as a subgroup and noted their tendency to defer to the counselors. This resulted in the SDC people becoming more assertive in the meeting as group members rather than as the so-called "research team." He also focused the group's attention on group goals and processes. He asked the counselors if they understood what the SDC people expected from the meeting. And, periodically, he asked the SDC people if they were happy with the way the meetings were progressing. In addition, he had the group express its feeling about disagreement with the result that people seemed to feel more comfortable in expressing their differences with each other. He also asked people to express how they felt when the group reactions interfered with their communication.

The effect of the group facilitator on the design workshop seemed to be as follows:

- The group was extremely productive during the total time that they were together. This was especially true of the 12-hour design marathon.
- All group members participated and appeared to be involved.
- Attention of the group members appeared to be keen throughout the meeting.

- Group discussion was focused on group goals and the group was self-evaluative.
- The group learned to control its own communication process as time progressed.
- A sense of group identity developed that has continued to persist. The SDC team is not viewed as outsiders, but as part of the group. The school counselors reflect a sense of identity and responsibility for the project.

Twelve hours of design work were conducted with the junior high school counselors.

Following each design meeting the SDC research team prepared a summary of the major points made during the meeting and fed this information back to the design teams at the beginning of the subsequent session.

III. RESULTS OF THE DESIGN WORKSHOPS

The ideas that were developed by the two design teams are presented below. The results of the work with the Monroe High School counselors is presented first, followed by that of the Sepulveda counselors.

A. RESULTS FROM MONROE

1. Problem #1--Manual Handling of Student Data

Counselors report that too much time is spent on paper work and filing. It is difficult to record and retrieve information about students. There is also no effective communication system for transmission of student information among counselors and between the counseling office and auxiliary services (registrar, child welfare, attendance office, health office, Vice Principals, and work experience coordinator).

a. Design Idea #1: Student Data System (SDS)

Student Data Base Inputs include:

- Elementary school cumulative folder
- Secondary school cum
- Attendance records
- Record of contacts (parents, student, outside agencies, V.P.'s, health, etc.)

- Health records
- Pupil Personnel Information form (PPI)
- Honors, awards, activities in and out of school, work experience
- Program card
- Teachers
- Counselor's name
- Record of special reports and complimentary reports to parents
- Report cards
- Progress reports
- Anecdotal data (cum, progress reports, contracts)
- See person X when dealing with student
- Post-high-school plans
- Which A12 will graduate from other schools
- Which A12's will graduate from this school but are located elsewhere
- Permits (language)
- Foreign exchange
- Religion
- Social Adjustment (S.A.) transfer (in or out)
- Reason for S. A.
- Financial status
- Report of job contacts

b. Categories of Output

Capability will be provided to call up any item, some sets of items such as program card, or any combination of items, any lists of students by any category such as: successful science majors; unsuccessful science majors; students with 1, 2, 3, ... fails; students without P.E.; candidate for advanced placement; industrial students; work experience students; kids short for grade level; kids with incompletes; required courses for graduation; academically gifted; low index students; permits; foreign exchange, bilingual; high priority for counseling; G.P.A.

c. Derived data, i.e., data not normally found in the data base but which can be derived from it.

- GPA
- Underachiever
- How many credits

d. Use of System

- Record of number of times each type of data used
- System should be tailored to each counselor
- Hardware:
  - line printer in office
  - display console for each counselor with function keys
  - quiet machines
  - book of cums updated each month
  - terminals for students--clerks in conference room
  - terminals for auxiliary offices
  - buttons for recurring questions
  - security of data--confidentiality and safety

2. Problem #2--Predictive Data for Decision-Making

There is a lack of information of a predictive nature for helping students make decisions regarding educational and vocational plans.

Design Idea #2: Prediction and Research System

A general-purpose prediction system will be developed that will generate a prediction formula, and will apply the formula to student data and display the predictions. The system will provide data on variables that account for significant parts of the variance.

The program will ask counselors or possibly students to define the variables that are to be predicted and will ask for list of potential independent variables. Some of the dependent variables that will be predicted are: GPA, success in particular course, success in college and vocational training, potential dropouts.

The counselors feel that family background data should be sampled as a predictive variable.

3. Problem #3

Too much counselor time is spent in preparing reports such as progress reports, D, Fail, U lists, etc. These procedures involve making up lists, posting data, checking lists, sending out reports, etc.

Design Idea #3:

The following performance reports will be automated: Report cards; progress reports (who requested reports) (quarter and final); special reports to parents; complimentary reports; D, Fail, U lists; reports to industry for employee recommendations (form letters); lists of failing athletes, failing seniors, whether failures of seniors will interfere with graduation, what switches in majors are possible for failing seniors that would allow them to graduate; form letters to parents of failing seniors; lists of average stanines for each class; possibly English, math, GPA, health and attendance data.

4. Problem #4--Student Programming

Too much counselor time is spent in programming and schedule development, majors.

Design Idea #4:

Use computer to assist in preparation of master program.

Automate student programming and scheduling.

Start early in semester in preparation for next semester's master schedule.

Given inputs:

- predicted enrollment
- predicted number of teachers
- sections in course

- teacher preference
- teacher requirements
- room requirements

Get student choices on preference.

Computer helps make master program that tries to optimize.

Late in semester, students fill out mark sense cards that schedule them into classes.

In summer, get exception lists. When students come in at beginning of next semester, iron out conflicts.

Only deal with new students or those changing majors at the beginning of the year.

5. Problem #5

Heavy student load, large amounts of derived work, etc. interfere with counselors being able to see all of their students.

Design Idea #5:

Develop procedures for scheduling students automatically according to priorities.

Design problem: Counselors do not want a scheduling routine because it would force them to make decisions farther in advance than they feel desirable. The problem of getting teachers to free the students would also interfere with operating the scheduling procedure successfully.

6. Problem #6

Counselors do not have enough time to see all of their students individually nor do they have enough time or information to do much more than treat those students they do see in a routine and repetitive manner in the areas of junior high and high school course planning, vocational planning, and college planning.

Design Idea #6

Automated interviews would probably contribute to solving a number of problems. A computer program will be developed that will allow counselors (who need not know how to program the computer) to develop their own automated interviews. These interviews are to be used by students with or without the assistance of their counselor. The SDC staff, however, will develop the first set of automated interviews in the requested areas of:

- Course programming
- Postsecondary educational planning
- Vocational planning

The course programming interview will help students make decisions regarding their choice of major sequences and changes in relation to interests, aptitudes, personality, school records, and possible future plans.

The program should allow the student to obtain names of the required courses and recommended electives. In addition, it should contain a "good" description of courses.

Postsecondary plans will be explored such as:

- Presenting student with information regarding future educational or occupational possibilities pending completion of his selected major sequence.
- Question-answer system for specific occupations--schools and their entrance requirements, characteristics, alternate possibilities, and, as pertinent, costs, scholarships, location, size, etc.
- Steps necessary to gain admittance to selected choice, sending transcript, taking tests, applying for scholarships, making application, etc.

The data base will include such items as information from college blue book, Pace data, school catalogs, occupational information, occupational outlook data, student data, predictive statistics.

7. Problem #7

There is a problem in monitoring the educational, vocational, and social development of all students.

Design Idea #7:

Install a tracking and monitoring system which will follow student's progress through Monroe in time, and monitor such things as:

- Taking required courses.
- Getting failing grades in course required for major sequence.
- Taking illegal course.
- Extended absence and tardiness.
- Change in performance status:
  - Multiple D's, Fails, U's.
  - Demotions, Accelerations, and return to proper grade level
- Potential dropouts.
- Students who check out and why.
- Student who must meet certain deadlines.

8. Problem #8

Counselors experience the general problem of recalling at some future date items they wish to remember.

Design Idea #8:

Allow counselor prerogative to request machine to remember certain information and prompts.

9. Problem #9

Counselors do not have the necessary information to substantiate their recommendations to students; they must rely mainly on subjective judgments.

Design Idea #9:

A follow-up data system should be designed to:

- Provide descriptive data on what has happened to students upon leaving Monroe: Number who went to junior college, college, vocational-technical school; grades; dropouts; armed services; salary; special-interest area; influence of high school; success in present endeavors.
- Build follow-up data into prediction and research system to enable student to base his choices on more reliable data.

Follow-up studies should be conducted on each graduate class more than one time.

10. Problem #10

How to reallocate counselor's time with the addition of computer assistance.

Design Idea #10:

Provide teachers with orientation of counseling service, and spend more time with teachers. Increase information exchange with teachers and other auxiliary service personnel, and train teachers to interpret student data. Include teachers on case conferences, and thus release counselors from supervisory role. Have counselors available before school, during nutrition break, lunch, and after school. Spend more time finding out information available from local industry. Have work-experience coordinator more closely aligned to counseling office. Improve articulation problem between high school and future schooling or work plans. Provide for more special group counseling; field trips to local industry by counselors and students; and a closer working relationship between high school and junior high counselors.

B. RESULTS FROM SEPULVEDA

1. Problem #1

Ability grouping is a time-consuming task for the counselor. Students are grouped into one of five categories (above average--35-40 students; average--40; below average--30; markedly below average--25; low index--20) with class limits set according to the group type. For B7's this is done on the basis of:

- IQ (California Test of Mental Maturity)
- Reading comprehension and arithmetic fundamentals of California Achievement Test.
- Teacher ratings for reading and arithmetic.

For other grades, additional indices are used such as marks, teacher recommendations, present groupings, and availability of electives.

Design Idea #1:

Head counselor will sort pupils into five groups using given data. A prediction model will be generated to simulate the counselor's predictions. A comparison will then be made of the counselor's predictions and the simulated prediction to determine the validity of the model. Changes to the model will be made according to teacher judgments and necessary regrouping.

2. Problem #2

Grade counselors have the job of assigning pupils to reading improvement (pupils with average ability but low reading achievement), based on:

- Basic Reading
  - Total index stanine below average
  - Reading comprehensive stanine equal to one
  - Teacher recommendation of "nonreader" is considered
  - A low mark in English after B7 is also considered.
- Reading Improvement
  - Teacher recommendations
  - Significant difference (min. 15 pts.) between language-nonlanguage CTTM in the average range
  - Significant difference (2 stanine min. diff.) between total index stanine and reading index stanine.

One idea presented was to compare A6 marks in reading and arithmetic and the teacher's recommendation.

Design Idea #2:

Same as Design Idea #1, but excluding pupils who have already taken the course.

3. Problem #3

Due to the time spent on paper work and filing, it is difficult to record and retrieve information about students. There is also the lack of an effective communication system for transmission of student information among counselors and between the counseling office and auxiliary services (registrar, child welfare, attendance office, health office, Vice Principals, and work experience coordinator).

Design Idea #3: Student Data System (SDS)

a. Student Data Base Inputs

- Elementary school cumulative folder
- Secondary school cumulative folder

- Attendance records
- Health records--pupils with significant defects
- Record of contacts (parents, student, outside agencies, V.P.'s, health, etc.) including record of interview card
- Pupil Personnel Information Form
- Honors (3 semesters without U), awards, activities in and out of school
- Program card
- Teachers
- Counselor's name
- Record of special reports and complimentary reports to parents
- Report cards
- Progress reports
- Post-high-school plans
- Religion
- Social adjustment transfer (in or out), reason
- Tentative high school major sequence made in Ed. guidance unit
- Financial status
- Unisort card
- Test data on cum
- Educational Guidance Record

b. Categories of Output

Capability will be provided to call up any items, any lists of students by any category such as:

- Group pupil is in
- Which groups have vacancies

- D, Fail, U pupils
- Gifted pupils
- Average students, underage
- Scholarship and citizenship lists--3.5 GPA and 7 E's (every semester for every pupil)
- Pupils with no record of interview card
- Elective plans for next semester

4. Problem #4

Monitoring the educational, vocational, and social development of all pupils.

Design Idea #4:

Install a tracking and monitoring system that will follow pupils' progress through Sepulveda in time:

- Keeping track of deficiencies due to failures
- Identifying negative and positive grade changes
- Sequencing problems--industrial arts, language--based on English marks unless parents insist, typing, homemaking
- Eligibility problems

  Review candidates for algebra (test scores from algebra prognosis, supplementary data, total index, arithmetic stanine, 10 week mark in math)
- Identifying "nonexploring pupils"
- Minimize chance of repeated course with teacher who has previously failed pupils
- Correlation between attendance and poor grades

5. Problem #5

Too much counselor time is spent preparing reports, i.e., progress reports, D, Fail, U lists, etc. These procedures involve making up lists, posting data, checking lists, sending out reports, etc.

Design Idea #5:

The following performance reports will be automated: report cards (quarter and final); progress reports (who requested report); special report to parents; complementary reports; D, Fail, U lists; over-age and under-age pupils; marking survey for teachers; and distribution of teacher's grades (implications for assessing marks/ability level). Parent must get notice before final report card if pupil gets an F.

6. Problem #6

The construction of the master program consists primarily of a large volume of routine data processing.

Design Idea #6:

The computer will be able to assist in construction of the master program by automating certain of the routine data processing functions. All courses except math, English, and social studies will be programmed by the counseling staff. Math, English, and social studies will be fit into the master schedule using such inputs as estimated enrollment, teacher preferences, etc.

7. Problem #7

Communication of information among counselors and between counseling office and auxiliary services such as Vice Principal, Registrar, health service, child welfare, and attendance officer, probation department, clinics, private doctors, social agencies, Bureau of Census, etc., is weak or nonexistent.

Design Idea #7:

- Compile all remedial actions taken by referral people. The offices in the school might use mark sense cards, which describe by coding the nature of the contact and the action taken.
- Compile reports for outside agencies mentioned above including specific test data and remedial actions taken by schools, etc.

8. Problem #8

It is desirable to predict high school performance, postsecondary education, etc., based on junior high performance indicies, in order to enable pupils to base their chances on more reliable data and to provide the counselors with accurate information on what happens to their pupils.

Design Idea #8:

A prediction system will be developed that will predict:

- High school performance
- Frequency of high school major sequence changes (which area, extent, nature, when)
- Comparison of A6 marks with B7 and A7 marks
- Comparison of how Sepulveda algebra marks relate to Monroe geometry grades vs how Monroe algebra grades relate to geometry grades.
- Follow-up below-average, low index, educationally mentally retarded pupils at Monroe to decide if these pupils might not more profitably pursue their high school career at another school; determine what junior high school and high school can do to improve progress.

9. Problem #9

Counselors do not have enough time to see all of their students individually nor do they have enough time or information to do much more than treat those students they do see in a routine and repetitive manner in the areas of junior high and high school course planning, vocational planning, and college planning.

Design Idea #9:

Automated interviews would probably contribute to solving a number of problems. A program will be developed that conducts dialogue or automated interview, or retrieves pertinent information for teachers and individual pupils. The system will permit nonprogrammers to construct their own automated dialogue or interviews.

Examples of likely interviews are:

- Interview to assist a pupil in deciding whether or not he should take algebra in junior high school considering his high school major sequence preference, the kind of college he plans to attend, etc.
- Interviews that inform the student about college entrance requirements, costs, etc.
- Interviews that use a student's self-description (interests and abilities) and information from the student data base to suggest likely vocational plans:

.. types of jobs that relate to certain majors

.. classifications of jobs pupil might be suited for

. Source information might include

.. SRA Job Family Series

.. Courses related to Industrial Education put out by Los Angeles City Schools.

PART II

THE SOFTWARE FORMULATION AND DESIGN

Our interest in designing a man-machine system that would incorporate humanistic values led us to approach the formulation problem from a somewhat different direction than we might have taken had we been concerned only with implementing the original design requirements with economy, efficiency, and dispatch. Before detailed formulation could begin, it was necessary for us to see if we could develop another set of requirements: conditions for assuring that the system would be humanistically oriented. We felt that even if these conditions could not be specified with as fine precision as the design requirements, including them in our plans before formulation began would increase the probability of producing a system that respected humanistic values. Chapter 5 discusses our attempts to specify our humanistic requirements. Chapter 6 outlines major aspects of the computer software systems. Appendix G describes the language and the system in greater detail and indicates at points how some of our humanistic concerns were incorporated in the system.

CHAPTER 5.

SOME HUMANISTIC CONSIDERATIONS

I. THE CONSIDERATION OF HUMANISTIC VALUES IN PROGRAM REQUIREMENTS

In our search for conditions that would assure a humanistic orientation in the program system, the first step was to attempt to answer the question: Is it possible to design a computer program system that is humanistically oriented? Our answer, based on logical and philosophical analysis, rather than hard empirical data, was a qualified "yes." It is possible, we decided, but not possible for all systems.

II. THOUGHTS ON THE POSSIBILITY OF HUMANISTIC MAN-MACHINE SYSTEMS

The inclusion or use of computers and computer programs in a system that deals with human beings does not, in itself, dehumanize the system. In fact, computers and computer programs are tools that can be used to enhance human values in systems--if one wants them to. Computers and programs are constructed and controlled by men. Their design and use, therefore, will reflect the attitudes and values of men. If those attitudes and values are humanistic, the system may be; if they are not, the system will not be except by accident.

A look at the history of computer systems and man-machine systems does not provide us with any nice examples of humanistic systems that would, as special cases, prove the possibility. In fact, some persons might argue that no computer system to date has given one scintilla of evidence to support any faith in the possibility of humanistic man-machine systems. They may be right. However, to our knowledge, very few, if any, man-machine systems have been designed with the enhancement of humanistic values as a prime objective or uncompromisable requirement. Rather, they have been designed to satisfy objectives such as bureaucratic expediency, monitary profit-making, cost-saving efficiency, or some combination of such goals. Furthermore, many of the largest computer-based systems have been developed to realize goals that are themselves anti-humanistic. (However necessary they may be for the realization of other values, systems that are dedicated to the detection and destruction of enemy personnel are not humanistic and cannot be made humanistic.)

A. TWO PRIMARY RULES FOR HUMANISM IN MAN-MACHINE SYSTEMS

Our thinking led us to two primary rules:

1. The system shall exist for the convenience of--and to fulfill the needs of--the users of the system; and

2. The system must be respectful of the humanity of those who are processed by the system.

The order is not meant to imply any priority of these points. It was dictated by the fact that all systems have users; not all systems process people. And, of course, with some systems, the users and the "used" are one and the same. If the system processes people, the second point is more important than the first. That is, if a conflict arises between the needs of the users and respect for the humanity of those who are processed, and it cannot be resolved in favor of the latter, the system will lose human value. (It may be necessary and even desirable that a painfully injured person undergo a lengthy interrogation before hospital treatment can begin; however, such a hospital processing system is less humanistic than an otherwise equivalent one that treats the patient promptly.)

Within our counseling system, in most subsystems except the interview, the counselor is the user and the student is the one processed. In the case of the interview, the student is both the user and the person processed.

Clearly, in our system, the counselor is the primary user and so, to satisfy the requirements of our first condition, we must fulfill the needs of the counselor; however, in order to avoid violating the second condition, we must never be disrespectful of the humanity of the student.

The rest of this chapter will be devoted to considerations relating to the satisfaction of both rules.

B. THE USER'S NEEDS

We have already indicated how one can work toward user satisfaction in system development by way of involvement of the user in system design. However, there are some specific things that one should try to do for the user that he may not even think to ask for.

1. Responsiveness

a. Responsiveness in Time

(1) If the user requests that the computer system perform some task for him (e.g., retrieve some data) the request should be satisfied rapidly. He should get prompt action in response to his request.

(2) If the user feels the need to cogitate, muse, consider, or otherwise waste time between commands to the system, the system should not bother him with importunate requests for action.

This combination of prompt response and patience implies a time-shared system, for obvious economic reasons.

h. Responsiveness to Individual Differences

(1) Errors

Different people react differently to computerized systems. Some persons even make mistakes using computers. The system designer who is interested in constructing humanistic systems does not say, "Anyone who can't follow the rules deserves what he gets!" Rather, he tries to anticipate human "errors" (failures to do things in those ways that would lead to greatest efficiency in computer terms) and devises the system in such a way as to maximize the probability that the user gets what he wants, rather than what he "deserves."

Computer systems can, of course, be designed to detect many classes of "erroneous" or "illegal" inputs supplied by human beings. Many programs are so constructed. An "erroneous" or "illegal" input to a computer system is one that the system cannot understand or cannot interpret unambiguously. The important consideration in designing a system that handles "errors" humanistically or non-humanistically is what the system does when it comes across an "error." Many computer systems "reject" the requests or jobs of users who make mistakes or "errors." A humanistic system would, we think, be one that would tell the user that it did not understand, what it did not understand, and if possible and appropriate, suggest how the user might rephrase his request so that the system could understand it. And it would be patient while the user tried to find language that the system could handle.

What we ask for here is a sort of humility in the system. The system designer should feel that even if the users do not understand his system, they are not necessarily subhuman. Erring, after all, is human; and frequently made errors are particularly human.

(2) Ease of use

Some persons take more readily than others to expressing their desires in languages that are "comfortable" for computers. However, no reasonable man would wish that a priesthood should be set up in his discipline which would exhalt the cabalists who speak well to computers, and cast down the people who do not.

So, the language that the program requires one to use in communicating with the system should not be a terribly esoteric, specialized one, but rather an easy to learn, easy to use language. Ideally, it should be the mother-tongue of the user. But computer technology is not up to that yet and that is the failing of computers and computer technologists, not computer (or potential) users. Many so-called user-oriented languages exist today, but they are almost exclusively designed for the very sophisticated and specialized user.

However, even among those who are comfortable with computers and computer languages, there exist differences of opinions about which is the best language to use. The conscientious designer of humanistic systems will recognize this fact and uncritically make allowance for it. That is, he may have produced the best language even for, say, counseling, but there will still be people who do not like it and would wish it otherwise. A truly humanistic system should suffer fools gladly and permit the user to make changes in the language. However, the changes should apply only to the changer; those who like the prevailing language, or their own specified variant, should not be affected by another user's desires.

2. "Open-Endedness"

Experience with using a system usually leads to suggestions for additions to or changes in the system. Unless the system has been designed with this expectation in mind, system modification may be very difficult. Consequently, the humanistically designed system should be "open-ended" and easily modified so that users' desires for change can be readily implemented.

C. RESPECT FOR THOSE WHO ARE PROCESSED

One unfortunate aspect of nonhumanistic use of computer systems is that often the user himself is not the one who is harmed; the damage may be to those persons to whom the program is applied--those who are processed by the system. Some of the more serious problems that arise with respect to processing people with computer systems are: privacy of personal data; the misuse of prediction systems; alienation.

1. The Problem of Privacy

Although most people would probably agree that an individual has a right to privacy of personal data, it is clear that such rights are very often violated or not respected. There are many situations in which we are forced, even by law, to reveal personal data about ourselves whether we want to or not. For example, when we are in public school, when we pay our income taxes, or even when we move from one address to another, we must give certain information to public agencies or suffer penalties. If we assume, therefore, that the individual does not have the right to withhold information, a humanistic orientation would demand that personal information taken from him not be used in ways intended to damage him. There are currently few ways that the law can provide this guarantee. Those laws which are intended to preserve some measure of privacy of personal data have repeatedly been proven inadequate in practice. Generally, a plaintiff must be able to demonstrate that he has suffered damage, but the definition of damage is so vague and varied as to be almost useless except in particular areas such as racial matters or libel or slander. Laws concerning libel and slander can give an individual no protection unless the information used against the individual is false; but it is obvious that real damage can result even if the information disclosed is true.

Technology also fails to provide a complete answer to the problem of privacy. Manufacturers of computers can provide both the hardware and software that would be similar to a lock on a safe; but if one knows the combination, or has the key, no amount of technology can prevent that person from using the system.

2. Some Radical Recommendations

Clearly, it is impractical to include as a system requirement the revocation of many existing laws. It is much easier to propose system requirements that may humanize the effects of laws in particular circumstances. With this aim in mind, we propose the following radical recommendations to reduce somewhat the problem of privacy:

a. The Right of Access

We recommend that if a dossier or information file is to be kept on any person, that person should be notified of the existence of the dossier and be allowed access to it at will.

b. The Right of Knowledge of Source

We recommend that the subject of a dossier have the right to know the source of any information included in his file, and that such source be recorded with the information.

c. The Right of Review, Refutation, and Appeal

We recommend that the person who is the subject of a dossier be permitted to review and refute any information in the dossier, and that his refutation be included as an integral part of the dossier, and that appeal mechanisms be instituted for the deletion or change of information in the dossier.

d. The Right of Approval of Dissemination

We recommend that the subject of a dossier have the right to approve (or veto) the transfer of information from his file to other agencies, persons, or files.

In cases in which the dossier is, or is imagined to be, damaging to an individual, these recommended rights correspond roughly to all certain well-known rights denied generally from Articles IV, V, and VI of The Amendments to the Constitution of the United States of America: the right to be informed of the nature and cause of the accusation; the right to be confronted with one's accusers; the right to rebut and appeal the charge; the right to refuse to be a witness against oneself.

3. Problems Relating to Prediction

Computer systems that process persons can often be used to generate predictions about their subjects, and computer-generated predictions can be of great value to system users and even to the processed person. However, there are some dangers involved.

One danger is that too much reliance may be placed on statistical prediction. Too often formulas are accepted and used as though they were God-given laws. A predicted probability of graduation of .95 for Tommy Jones does not, of course, mean that Tommy will graduate. It means only that in a large sample of students who share some specified characteristics with Tommy, a certain percentage, namely 95 percent, is expected to graduate. But all too often people who know this fact, and know that Tommy is a unique person, behave as though the prediction were absolute truth.

Counselors often use statistical predictions to direct students to follow courses of action that lead to the fulfillment of the predictions. In such cases, false prediction models can become valid with the passage of time. The automation of such procedures is not an improvement.

4. The Problem of Alienation

Many persons do not like being processed by computer systems. Although their reasons are often irrational, there are good reasons for objection in many cases. Computer systems very often treat the persons they process as though they were numbers or objects. The system may require that things be done in complicated and unnatural ways in order to satisfy the needs of the computer. They often greatly decrease the possibilities for contact between the processed person and persons in the system. Responsibility for evaluation and decision making may be passed to a program to which extenuating circumstances cannot be explained.

It seems very likely that some of these problems could be alleviated by involving representatives of the population to be processed in the design of the system.

CHAPTER 6.

THE COMPUTER SOFTWARE SYSTEM

I. DESIGN OF THE SYSTEM

The program system has been designed and formulated for on-line use in a time-sharing system. (Prototype components have been programmed for the SDC Q-32 time-sharing system and subsequent forms will be written for SDC's 360 time-sharing system.) The counselor will communicate with the system through a teletype (or electric typewriter) and during the moments that he is not using the computer, other counselors and other users will be running their programs. Although the customary mode of input and output will be a keyboard device, card readers and line printers will be used for bulk input and output when the user so desires or specifies.

The system is designed to be maximally responsive. User requests will be answered as rapidly as possible (usually "immediately") and any detectable errors in inputs will be reported to the user at the time of input so that the inputs may be corrected and re-entered without delay.

It is convenient to think of the initial version of the system as consisting of ten modules or parts.

II. SYSTEM FEATURES

A. DATA DESCRIPTION

The system will set up data bases of items as named and described by the user, and new items may be named, described and added to existing data bases constructed by the system. The actual structure of a data base is of no concern to the user. He need not bother with the absolute or even the relative locations of any of the items and may, therefore, imagine the data base to be structured in any form suiting his habits of thought. However, the user must concern himself to some extent with the nature of the items. He must name them so that he can refer to them in storage, retrieval and other kinds of statements. He must also tell the system what kind of data to expect (as letters or numbers), and may wish to impose certain further conditions on the nature of the data to facilitate quality checks of input data by the system.

B. DATA RETRIEVAL

A data retrieval statement is a request for data to be retrieved from the data base. With it the counselor specifies the data desired and the population of students when records should be searched. Such requests may be made either from the teletype keyboard or by card input. The retrieved data may be output on either the teletype or the high-speed printer. Counselors will use retrieval statements to inspect data in the student data base, and in conjunction with calculation functions and form descriptions (see Sections D and F), to prepare reports such as report cards, D-Fail-U lists, etc.

C. DATA STORAGE

Data storage statements are used to prepare the program for the input of data into the data base. They specify the student population and name the items to be stored. Once a data storage statement has been made, the program is ready to receive data. Input data will be checked against the item descriptions in the data base description (Section A) and faulty inputs will be reported. Storage statements may refer to input forms (Section D) to facilitate the input of the large volumes of data.

D. INPUT AND OUTPUT FORMS

At certain times it will be necessary to read in or print out large amounts of data using certain prespecified formats. Some cases of input are: initial loading of the data base from cards; recording students' marks for the 15th week progress reports; teachers' recommendations of candidates for reading classes. Some output examples are: progress reports; program cards; the total cum.

1. Input Forms

If data are to be read into the data base from cards, it is necessary that the program know what data are on the cards and where each item of data occurs on the card. This information is supplied to the program by an input form description. Once an input form has been described and named, it may be called upon by name at any time without being redefined. Statements within an input form description are used to: identify card field ranges; specify data base items to be loaded from cards; name the form. Input form names may be used within data storage statements.

2. Output Forms

Output form descriptions tell the program what information is to be printed, where it should be positioned on the page, and the name of the form. Output form names may be used within data retrieval statements to produce reports.

E. DEFINE STATEMENTS

A define statement is a means whereby the user may make certain kinds of changes in the language in order to simplify frequently used expressions, to satisfy idiosyncratic desires, or to make the language more English-like (and hence, easier to teach and use). It is simply a string-substitution device and yet, because of the peculiar structure of the basic language, it can make a great contribution to ease of use.

F. CALCULATION ROUTINES

The counselor will be able to use the computer to perform arithmetic and logical operations on data in the data base, or as a very powerful "desk calculator." Calculation phrases may be used within retrieval statements to produce "derived" data.

G. PREDICTION ROUTINES

Part of a counselor's job is anticipating what might or might not happen to his students at some future time. This, of course, is a prediction problem. However, not all counselors are well versed in prediction and statistics. Prediction routines are provided to satisfy the needs of those counselors who do not remember their statistics courses, as well as for those who do. In order to predict, it is only necessary that the user specify the criterion variable, the predictor variables, and a population. A prediction formula will then be computed and retained for later use. Prediction formulas may be called upon by name for application to individual students.

H. TRACKING AND MONITORING

Tracking and monitoring is a special case of retrieval. In general, these routines will be used for information about situations which (1) are of low frequency of occurrence, (2) have potentially serious consequences, and (3) may pass unnoticed until they result in disaster for a student. A tracking and monitoring statement is, basically, a retrieval statement which continues to remain in force until it is deleted. Any time there are data satisfying the retrieval request, they will be reported automatically.

I. REMINDER SECRETARY

The reminder secretary routine permits the counselor to store messages to be typed out for him at a later time of his choosing.

J. AUTOMATED "INTERVIEWS"

Automated "interviews" for student use will be developed within the PLANIT (Programming LANguage for Interactive Teaching) system.[1] Because the number of terminals at each school will be small, few students can be accommodated and consequently the use of the interviews will be experimental only. Two interviews are currently being formulated: An interview to assist a student in the exploration of vocational information; and an interview to assist a student in the selection of a college.

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[1] Feingold, S. L., and Frye, C. H. User's guide to PLANIT. SDC document TM-3055/000/01. October 17, 1966. 214 pp.

PLANIT will also be used to prepare individualized letters or reports for students. Because this use does not require student interaction at a terminal, it will not be restricted to experimental explorations. One application of PLANIT to the preparation of individualized letters has been formulated: a letter that gives an 8th-grade student information that can help him make a decision about taking algebra in the 9th grade. Some examples of the output of a first draft of this program are given in Appendix H.

PART III

TOWARD A MORE HUMANISTIC APPROACH

How can humanistic values be included in the design of educational systems? This question is one that has assumed increasing importance to members of the Technology Directorate's Education and Training staff presently engaged in the design of a man-machine counseling system. In the design of the system, the project staff has come more and more to see its concern centered on two key objectives: One is to find ways to make school counseling more humanized, using the computer, if possible, as one of numerous means to that end. A second is to develop procedures or processes for system design, development and implementation that are humanistically oriented. This section describes some of the ideas pursued by this project as a result of our concern for the latter objective.

It is difficult to define in meaningful terms the humanistic concept. Certainly, central to the idea is the notion that procedures will be developed that make the human central in the system. It is not enough to say that schools are, in and of themselves, humanistic institutions designed to provide education and acculturation to the students. It is not enough to say that we care about people and students. It is too easy to say that we are all primarily concerned with the growth of the student and let it go at that. If the word "humanistic" is to have real meaning in our work with schools, we must find actual procedures that do, in fact, put persons into the center of this design and development process. This is not an easy goal to achieve.

One attempt in this direction was to include the counselors from the schools as part of the design team for the current project (see Part I, Chapter 4). We felt that by involving the counselors in the design process we would produce a system that would better meet their needs rather than solely those that we, the researchers, might anticipate. One concern, however, was that the counselors might let their lack of knowledge about computers stand in the way of expressing their ideas and defer to the ideas of the researchers. In order to insure their participation, a consultant from the National Training Laboratory--Dr. Gerard Haigh--attended most of the meetings with the high school counselors and focused his attention on facilitating the communication process during the design work. He was effective in keeping the group from fracturing, in increasing the involvement and participation of all the members, and in strengthening the group process.

The design ideas that emerged from these sessions were identified as the product of the total design team rather than those of the System Development Corporation researchers, or of the counselors. Moreover, a strong group feeling developed between the counselors and the researchers, opening the door for future innovation and acceptance of these innovations at the school.

Gradually, however, the staff, in laying out the detailed specifications for the design ideas, came to be increasingly disenchanted with the orientation of the system. It became clear that the design ideas were primarily oriented to ways in which the computer might be used to assist the counselor. Little emphasis was placed on determining how the counselors might use their new-found time to help students--or on discovering whether the system, as planned, might even be detrimental to the interests of the student. We felt that we were headed toward developing a man-machine system that would have more of the characteristics of a machine than of a person.

We saw one opportunity to actively reorient the system at the school. The research staff decided to explore the possibility of having the counselors trained in group-counseling techniques. We told them that we felt that if they were more comfortable working with students in a counseling relationship, they might use the computer as one means to gain free time to be with students, rather than possibly becoming more immersed in data manipulation.

Another opportunity to explore these ideas further came in the form of an invitation from the University of California at Los Angeles to participate in teaching a graduate class on moral and ethical considerations in counseling. The following chapters outline these later considerations--the initiation of group-counseling, and the experience with a graduate class in counseling.

CHAPTER 7.

THE INITIATION OF GROUP COUNSELING

A separate meeting was scheduled with the counselors at each of the schools to discuss our dissatisfaction with the direction the proposed system seemed to be taking. We talked about our concern that little thought had been given to how the counselors might spend more time in direct interaction with students. We discussed with them the notion that group counseling might be one way to bring students into a more honest confrontation with their problems and permit the counselor to see more students during the time available.

The high school counselors were agreeable to the idea. They were willing to devote two hours a week to a training program, and even suggested a person in the district who was experienced in training counselors in group technique. This person was contacted and given permission by the district to devote the necessary time for the training sessions. For the past semester, all 12 of the high school counselors have been in a training program, and 9 of them have formed groups of their own.

The junior high school counselors, however, were not favorable to the idea of group counseling. They seemed to feel that the technique would focus mainly on the student's personal problems and degenerate into discussion of the student's dissatisfaction with the school and his teachers. Their feeling was that their position, as school counselors, was to handle only educational and vocational problems, not personal ones. Further, they felt that, given additional time, they would prefer individual counseling to group counseling. As has been our position on these types of matters, we respected their decision.

Most of the high school counselors who formed a group selected approximately ten students who were on the same grade level but otherwise heterogeneous (one counselor selected students who were discipline problems). The groups were scheduled to meet once a week, during a different class period each week to minimize the loss of class time for one particular subject. Prior contact had been made with the respective teachers to solicit their cooperation in excusing their students.

Each counselor was responsible for taping each of his group counseling sessions, with the permission of the students. The counselors met weekly with the trainer, Mr. Philip Lewis, for a two-hour training session. At that time several counselors would play back segments of their tapes for the other counselors and the trainer to listen to. The trainer demonstrated counseling techniques by calling the counselors' attention to points in the sessions where the counselors could have been either more active or more effective in their responses. For example, in the early sessions, counselors were reluctant to interrupt the group to make any response. Mr. Lewis pointed this out and suggested that the counselors confront the students with hypotheses about what was going on.

In this case, he pointed out that the counselors didn't need to worry about being wrong because the students would correct them. These suggestions and reactions were always thrown out as hypotheses by Mr. Lewis and the counselors discussed their reactions as a group.

Many feelings were brought up in the counselor-student group sessions: students' feelings about dress codes; their resentment about not being allowed to smoke; their annoyance at being told they can set up clubs to debate controversial issues and then not being allowed to; their feeling that the school leader is less severely punished than the "problem" student; their contempt for the teacher who urges independent expression of thought, yet grades the student on how closely the student's opinion corresponds to his own; their hostility toward the teacher who encloses a fail notice in a birthday card; their feeling that problems at home affect their performance at school; and, more mundanely, their reluctance to have data processing machines select their teachers.

In sum, allowing the student to vent his emotions was beneficial in two ways: The student tends to view the school more favorably for giving him a chance to express his views; there was definitely a feeling that finally "somebody will listen to what I have to say." Further, the students are less apt to make their own rules when they can express their views. These views are often the very ones that cause trouble at the school because the students feel the lack of equity in school rules, and make their own. This eventually gets them into trouble with the school authorities and only increases their deepening sense of alienation toward the school. This chance to air these views opens them to the opinions of others and makes them aware of the other side's position.

Probably the most positive impression gained from observing these sessions is the desire to continue the groups next semester--a feeling expressed both by the students and the counselors. Additionally, several teachers have expressed the desire to participate in the groups. This reaction has most frequently come from teachers who have noticed positive changes in students who had previously given them trouble in class. As these changes have become apparent, teachers have been more positive about communication with the counselors, and cooperating in releasing students from class for the sessions.

Thus, the groups have served to decrease one of the prime problems counselors have had to contend with, that of being regarded as second-class citizens in the school. There seems to be a much more positive acceptance that "real" counseling can ease the problems that teachers encounter with students.

The group counseling sessions will be resumed next semester and it is our hope that certain of the implications discussed above can be confirmed by more quantifiable methods.

CHAPTER 8.

AN ETHICAL AND MORAL ANALYSIS OF THE DESIGN FOR A MAN-MACHINE COUNSELING SYSTEM: REACTIONS BY A UCLA GRADUATE CLASS IN COUNSELING

The project staff views its involvement with the University of California at Los Angeles class in moral and ethical considerations in counseling as one attempt to include humanistic values into the design of the man-machine counseling system. The intent of this chapter is to share the value of having an outside reference group critically analyze a system from an ethical and moral standpoint before the design is actually developed, and to demonstrate a procedure by which we have tried to insure the inclusion of humanistic values in the process of system change, planning, and development.

In particular, this chapter discusses three main points: our reasons for deciding to participate in the conduct of the course; how the course was conducted; and the reactions of the class toward various aspects of the counseling system as originally designed.

I. REASONS FOR PARTICIPATION IN THE CLASS

The basic factor in our decision to participate in the class was the occasion it provided our staff to function in the dual role of teacher/facilitator and learner.

First, as learners, we were interested in exposing our design ideas to reactions from members of the academic community. It was our premise that systems are developed within the value-framework of the people who develop them: There is nothing inherent in the computer itself that makes it a tool of power and alienation. For example, the counselors at the schools and the System Development Corporation staff worked together as a team to design a system that would fit the needs of these two particular schools; thus the moral and ethical considerations that went into the design were those expressed by the school personnel and by our staff. Critics of this approach felt that the design contributions of people in the field would be less than ideally valuable, since their perceptions of counseling have been influenced by an operating school system that is far from perfect. They felt that the system design would have been more optimal in terms of current counseling theory if it had incorporated the opinions of academicians in the field. We were, therefore, willing to place ourselves in the role of learner, with the hope that the class members would bring their knowledge of counseling, and specifically their moral and ethical considerations, to bear on our design. We, in turn, could bring back these ideas to the counselors for their consideration and, along with the counselors, form an increased consciousness of the problems inherent in the system.

Secondly, in the role of teacher/facilitator, we were concerned with increasing the counseling community's awareness of the changes that are taking place in counseling with the advent of the computer, as well as making counselors aware of the part they can and should play in guiding the direction of innovations in their field.

Our attention was focused on the crucial problem of how to help other schools faced with the decision to implement such a computer-based counseling system. We felt strongly that someone in the local schools should be knowledgeable about the advantages and limitations of such a system and the problems involved in implementation. Ideally, we felt, these knowledgeable persons should be the ones most directly concerned--the counselors. Obviously the task of instruction becomes too large to be performed on an individual basis for each school faced with such a decision; the colleges and universities having counselor-training programs are one logical place to tackle such a task.

The problem with this approach, of course, is the lag that has developed between technological advances and the academic climate. By participating in one class, we hoped to show that it is possible to bring awareness of advanced technology into the classrooms. Moreover we felt that, if our participation in the class resulted in a deepening of the students' involvement in decisions that affected their area of interest, we would have realized one important humanistic value.

II. CONDUCT OF THE COURSE

As teachers/facilitators, we were interested in presenting our system design to the students as a model for them to consider honestly and review in the context of their value system. We first attempted to give them some basic knowledge of computer systems and the programming problems that are involved. We also brought them to SDC so that they could see on-line demonstrations of work that had been started and types of equipment that could be made available to the school.

The ease with which we could accomplish our objectives rested on the ability of the students to take an active, participating role in the discussion--to open up to themselves and their values. This presented a real problem. It appears that students tend to seek the "expert" opinions of others as a substitute for their own self-acceptance. Further, teachers and professors seem willing to perpetuate this dependence.

The following quotation from one student's term paper seems an appropriate illustration of this point:

> "After reviewing the rapid progress that is being made everywhere by the computer and data processing, it is truly amazing that so few people know anything about computers and their capabilities.

> "A whole classroom of graduate students admitted that they knew nothing about computers, had never seen one, and could neither describe one nor explain them mechanically. They expressed indifference, confusion, discomfort, and some expressed in nonverbal ways an unwillingness to learn about the computers. The apparent discomfort grew worse when the class was asked whether or not a machine could have a value system. While some were ready to consider the problem and were ready to admit that it could have such a system, most were reluctant to say what kind of value system it should have, whose value system should be used, or to consider their own value systems as suitable for programming. The subject of personal ethics was treated in a similar manner. Some claimed an invasion of privacy. There was an anguished cry from one that set the tenor of the group: 'Exploitation.'
>
> "Now students who had merely been apathetic tuned in. Was there something to be inferred about future concepts of counseling? Students and professors broke for a coffee break more than slightly affected by the undercurrents. There was going to be more to this class than mere reading and parroting. More than mere surface discussion of a computer would be dealt with. We were to find a completely new world, just a few miles away."[1]

The fact that there was a happy ending to our efforts underscores the value of the open and honest responses the staff made to the inquiries and fears of the students. We believe that we, in education, have an important obligation to our students to make them aware of an important fact: We don't know all the answers. We don't know how people learn. And we don't know what a competent person is. We do believe, however, that learning and being a person depend on the ability of the person to know and respect himself as an individual.

Maybe this is what we mean by humanistic values. Instead of having students learn abstract theories, we can help each to look at himself as a human being whose life has meaning and a sense of personal value. By having students participate in group experiences that permit them to recognize their needs and the effect they have on others, perhaps we can help them to act as similar facilitators for their own counselees and, thus, decrease our reliance on data that we know have distinct limitations.

III. REACTIONS OF THE CLASS TOWARD VARIOUS ASPECTS OF THE COUNSELING SYSTEM

Each of the students was required to write a term paper examining the proposal for a man-machine counseling system in the schools. Particular emphasis was placed on evaluating the system from a moral and ethical standpoint. Each paper was analyzed and an attempt made to categorize the content under headings representing the major trends of thought. Additionally, many of the students made specific reference to the ten design ideas that emerged from the joint SDC-counselor design meetings (Part I, Chapter 3).

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[1] Janice L. Layne. Man, Machine, Systems and Education or the Computer Age. Report submitted in partial fulfillment of the requirements for Education 213B, "Legal and Ethical Bases of Student Personnel Work," Department of Education in the Graduate School, The University of California at Los Angeles, Winter 1967.

Specifically, the quotations from the students' papers were grouped under the following headings:

A. The Functions of Counseling and the Counselor's Role

B. Routine Clerical Work in Counseling

C. General Effects of the Computer on the Counseling Function

D. Reactions to the Design Ideas Proposed by SDC and the School Counseling Staffs, including:

  1. Comments on Privacy

  2. Comments on Power and Control

  3. Comments on Alienation and Depersonalization

E. Problems Involved in Writing Computer Programs for Counseling

F. Concern for the Possibility that the Computer will Usurp the Counselor's Role

G. Implications for Training and Clarification of Individual Responsibility

H. Underlying Philosophical Assumptions

A summary of the major points contained under each of the headings is contained in Appendix D.[2] The ideas contained therein have served to influence our thinking in the development of the system, specifically with regard to the development of humanistically oriented procedures.

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[2] A complete account of the students' papers is contained in SDC document SP-2874/000/00, "An ethical and moral analysis of the design for a man-machine counseling system: Reactions by a UCLA graduate class in counseling." 9 June 1967.

IV. SUMMARY

In conclusion, the values of the compendium of student reactions might well be that it encourages people to become aware of, and consider, their values before inflicting them on others. The following quotation seems to summarize this value:

> "Viewed from this philosophical standpoint, is computerized counseling good or evil? Does it recognize every person as a unique individual, capable of, and entitled to, the 'radical freedom' of choice? Or does it by means of a stereotyped approach and the fixed language of a fixed program reduce human beings to the common level of identical objects? Does it guarantee man's right to 'free responsibility and the spontaneous creativity, which remains the unique and fundamental characteristic of existence?' Or does it further limit the already limited freedom of man by tending to maneuver him into a position of dependence?"[3]

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[3] Akpan Esen. Computerized Counseling: Some Practical and Ethical Considerations. Report submitted in partial fulfillment of the requirements for Education 213B, "Legal and Ethical Bases of Student Personnel Work," Department of Education in the Graduate School, The University of California at Los Angeles, Winter 1967.

PART IV

EVALUATION

In designing a man-machine counseling system, our intent has been to focus on the student-counselor interaction. In this respect, the computer is viewed as one means of strengthening this interaction--freeing time for counselors and providing them with services for which they presently do not have the time or resources.

This chapter describes the data that were collected to assess the changes such an orientation has made on the two schools involved in the design--Monroe High School and Sepulveda Junior High School. As yet, no part of the machine system has been implemented. Necessarily, this means that the data represent a presystem evaluation, with two major exceptions.

First, the counselors' involvement in the training and design sessions has increased the counselors' awareness of their present procedures and of new and yet untried procedures that might improve their present mode of operation. This involvement, then, may be presumed to affect their present mode of operation, and, thus, their responses to the measures used.

Additionally, the counselors have also participated in training sessions, in which they learned group counseling techniques, and have conducted group counseling sessions with groups of their own students. This activity has had a direct influence on the counselor's perception of how his time might be reallocated with the installation of the computer system, as well as having changed his present duties. In essence, then, these data describe the system in the context of a changing orientation but prior to any actual computer implementation.

An attitude and belief measure was administered to the counselors at the school after the training sessions but prior to the design meetings. These data are presented as depicting the counselors' initial orientation to the counseling operation.

Subsequently, this measure was administered to a class of graduate students in counseling at UCLA. A comparison of these scores with those of the school counselors is presented to depict differences in orientation between counselors-in-training and counselors in an operating school situation.

The measure was again administered to the counselors one year later and a comparison made between their initial outlook and their outlook after they had participated in the design meetings and became involved in activities scheduled to allow them more direct interaction with students. This measure will be administered periodically to assess changes in attitude and belief as various parts of the system are implemented.

Additionally, the counselors have kept a record of the time spent in various counseling activities during the last semester, including an account of the topics discussed in student interviews. This log was kept on a weekly basis, rotating the days. This log will be kept for the duration of the project in order to record how the system affects their allocation of time.

The attitude and belief scale was also administered to the junior and senior high school students. The activities were modified so that they were appropriate to a student's orientation. As with the counselors, the students will be asked to complete the measure during various phases of the implementation period.

The students were also given the Crites Vocational Development Inventory. As with the other measures, this scale will be administered periodically during the implementation period.

Due to unanticipated problems with our computer system, the student data could not be analyzed in time for this report. A discussion of the student evaluation will appear in a subsequent publication. Part IV presents only those measures collected on the counselors.

CHAPTER 9.

MEASURES COLLECTED ON THE COUNSELORS

I. INTRODUCTION

One aspect of the counseling program that sorely needs strengthening is vocational guidance. Brookover and Nosow, in their analysis of vocational guidance in the United States, write: "Participation in an occupation is more successful for the individual and the community alike when adequate guidance and education are provided."[1] But the scope of the area to be considered, as well as the definition itself, persists in confusing research investigators and counselors alike. What is counseling and guidance? In the view of the professional, it seems that counselors should be comprehensively trained to deal with all areas of the student's needs--personal, educational, and vocational. The report of the U.S.O.E. Panel of Consultants on Vocational Education notes that the importance of occupational information and vocational guidance is recognized in most statements of goals and purposes concerning vocational education.[2] Yet, the panel was forced to content itself with unclear and redundant definitions as suggested by this excerpt from the report: "The purposes and functions of guidance and counseling do not lack for definitions, descriptions, controversies, and--professional vocabulary,which is very confusing and technical to even the professional educators."[3] Does the lack of a clear definition contribute to the lack of commitment to the development of a solid vocational counseling program?

School counselors are very much aware of the limitations within which they are working and have expressed the desire for change. Nevertheless, the development of an adequate vocational guidance program--designed to teach a student the decision-making skills required for vocational competence--does involve considerable effort.

Under the premise that the abstract ideals of a theory of career development degenerate with the inclusion of the operational constraints of the school, we constructed two measures to determine how these constraints affect the counselors: one was a scale of attitudes toward counseling, the other was a time log of counselor activity. Through repeated administrations of these measures, we hope to determine whether implementation of the design ideas developed in this study causes counselors to move toward a more adequate counseling program.

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[1] Wilbur B. Brookover and Sigmund Nosow. A Sociological Analysis of Vocational Education in the United States. A special study prepared for the Panel of Consultants on Vocational Education, July, 1962.

[2] Report of the Panel of Consultants on Vocational Education, Education for a Changing World of Work, U.S.O.E., 1964, p. 183.

[3] *Ibid.*, p. 189.

II. DEVELOPMENT OF THE ATTITUDE SCALES

Fishbein AB Scales were used to assess counselor attitudes toward counseling and guidance.[4] Fishbein rejects the unidimensional view of attitude; i.e., the AB scales do not use a single score to represent an individual's attitude. Thus, while two individuals might feel equally favorable about an object, they might differ in the degree of approval they felt about its various characteristics or components. Furthermore, although two individuals might feel equally favorable about an object, they might hold different beliefs about what should be done with regard to it. Fishbein attempted to clarify the distinction between "belief" and "attitude"; he uses "belief" in referring to the probability dimension of a concept and "attitude" in referring to the evaluative dimension of that concept. According to his theory, an individual's attitude toward any object is a function of his beliefs about the object (i.e., the probability that the object is associated with other objects, concepts, values, or goals) and the evaluative aspect of those beliefs (i.e., the attitude toward the "related objects"). Algebraically, it may be predicted that an individual's attitude toward any object $= \sum_{i=1}^{N} B_i a_i$, where B_i = belief "i" about the object, "a_i" = the evaluative aspect of B_i and N = the number of beliefs.

The overall concept used in the evaluation reported here was "counseling and guidance." The characteristics of this concept were first empirically determined through the analysis of a card-sort taken by counselors at 13 selected secondary and postsecondary schools across the country. (See Appendix A for a list of the card sort items.)

Responses to this card sort were factor analyzed to cluster the activities into major counseling functions. The resulting 23 functions were used as the characteristics of the counseling and guidance service in the AB Scales. Each of the 23 characteristics was made into a statement relating the characteristics to the counseling and guidance service. These 23 statements were then typed on individual cards, each card containing the five belief items (probable-improbable, possible-impossible, likely-unlikely, existent-nonexistent, and true-false). A second set of 23 cards was made for measuring attitudes on these; each card contained one of the characteristics as well as the five attitude choices (good-bad, sick-healthy, harmful-beneficial, wise-foolish, and clean-dirty). Additionally, a separate card was made for the overall concept "Counseling and Guidance" above the five attitude tests. On all cards, each of the adjective pairs was separated by a seven-place scale that the respondents were instructed to mark according to their belief or attitude on the given concept or function.

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[4] Fishbein, M. An Investigation of the Relationship Between Beliefs About an Object and the Attitude Toward that Object. Tech. Rep. No. 6, Contract NONR-233(54), University of California, Los Angeles, 1962.

The scale was first administered to the counselors at Monroe High School and Sepulveda Junior High School following a series of training sessions designed to acquaint the counselors with computer applications, and the advantages and limitations of the computer in its present state of the art. Their responses to the scale were intended to be used as a presystem evaluation measure, depicting their attitude toward counseling prior to becoming involved in any change of the existing counseling operation at the schools.

After teaching a class of graduate students in counseling at UCLA (described in Part III, Chapter 2), we used the opportunity to assess the attitude of the student counselors toward counseling via the same measure. The responses from the class provided a valuable basis for assessing the difference between counseling in an operational school setting and counseling as viewed by the academic community.

A. COMPARISON OF ATTITUDE TOWARD COUNSELING BETWEEN SCHOOL COUNSELORS AND COUNSELORS-IN-TRAINING

Table 9-1 presents the attitude and belief scores for each of the two groups, i.e., the counselors and the UCLA counselors-in-training. The subscript "a" following each number denotes an attitude score for each of the 23 characteristics of counseling; the "b" denotes a belief score for each of the 23 statements relating the characteristics to the counseling service. The possible range of scores for each statement was from -15 to +15 (i.e., both the A and the B Scales are comprised of five seven-place bipolar adjective scales). The actual range of the A scores was 7.2 to 12.2 for the school counselors and 4.5 to 12.7 for the UCLA counselors-in-training. The range of the B scores was -2.3 to 14.3 and 1.7 to 10.7 for the two groups, respectively. Figure 9-1 represents a plot of these scores. Comparison of these scores shows that there is some difference between the two groups. In order to maximize the overall attitude toward counseling and guidance, those characteristics (or functions) that are highly regarded should have a high probability of existence, while those with a low evaluation should have a low probability of occurrence. In other words, if the evaluative and probability aspects differ, overall positive attitude toward the concept or function will be decreased.

For the evaluative aspect of the characteristics, the correlation between the school group and that at UCLA was -.14, indicating virtually no agreement between the two population samples on what are the characteristics of ideal counseling and guidance.

Table 9-1. Mean Attitude and Belief (AB) Scores on 23 Counselor Characteristics: A Comparison Between School Counselors and Counselors-in-Training

Counseling Characteristics and Probability Statements	Mean Scores MONROE & SEPULVEDA	 UCLA
1a. Individual counseling	11.5	11.7
1b. The Counseling and Guidance Service includes individual counseling	3.3	10.7
2a. Group counseling	10.4	9.4
2b. The Counseling and Guidance Service includes group counseling	6.1	4.0
3a. Case studies of students	8.8	6.0
3b. The Counseling and Guidance Service includes case studies of students	7.2	5.6
4a. Teacher-counselor conferences	10.1	11.9
4b. The Counseling and Guidance Service includes teacher-counselor conferences	11.6	6.8
5a. Transfer of student information between teacher and counselor	10.3	10.5
5b. The Counseling and Guidance Service includes transfer of student information between teacher and counselor	11.0	6.5
6a. Parent-counselor conferences	11.0	11.6
6b. The Counseling and Guidance Service includes parent-counselor conferences	12.9	5.4
7a. Transfer of student information to parents	10.1	7.2
7b. The Counseling and Guidance Service includes transfer of student information to parents	10.9	1.8
8a. Test administration, scoring, and recording	10.8	4.5
8b. The Counseling and Guidance Service includes test administration, scoring, and recording	10.5	10.6
9a. Registration, schedule changes, program requests, transcripts	8.6	6.6
9b. The Counseling and Guidance Service includes registration, schedule changes, program requests, transcripts	13.5	6.8

Table 9-1 (Cont'd)

	Mean Scores	
Counseling Characteristics and Probability Statements	MONROE & SEPULVEDA	UCLA
10a. Contacts with other students and agencies to assist student	9.5	9.7
10b. The Counseling and Guidance Service includes contacts with other schools and agencies to assist student	8.9	6.1
11a. Follow-up studies of students after graduation or dropout	9.3	10.5
11b. The Counseling and Guidance Service includes follow-up studies of students after graduation or dropout	0.0	1.7
12a. Curriculum evaluation and planning	10.8	11.4
12b. The Counseling and Guidance Service includes curriculum evaluation and planning	5.6	6.3
13a. Student cumulative folders	12.2	6.2
13b. The Counseling and Guidance Service includes student cumulative folders	14.9	8.8
14a. Tracking of student performance	10.1	8.6
14b. The Counseling and Guidance Service includes tracking of student performance	9.8	6.8
15a. Test interpretation to enable students to make decisions as to success in particular course or program	10.9	5.9
15b. The Counseling and Guidance Service includes test interpretation to enable students to make decisions as to success in particular course or program	11.0	10.3
16a. Identification of skills, aptitudes, and interests so that students can make decisions about occupational goals	11.6	8.4
16b. The Counseling and Guidance Service includes identification of skills, aptitudes, and interests so that students can make decisions about occupational goals	10.3	11.4

Table 9-1 (Cont'd)

Counseling Characteristics and Probability Statements	Mean Scores MONROE & SEPULVEDA	 UCLA
17a. Placement, scholarship, test or status reports	8.8	5.6
17b. The Counseling and Guidance Service includes placement, scholarship, test or status reports	11.3	6.4
18a. Computer technology in counseling	11.4	5.1
18b. The Counseling and Guidance Service includes computer technology in counseling	0.9	3.2
19a. Financial aid to students (scholarships, jobs)	10.6	12.7
19b. The Counseling and Guidance Service includes financial aid to students (scholarships, jobs)	5.2	3.9
20a. Industrial contacts for student placement opportunities	7.3	11.8
20b. The Counseling and Guidance Service includes industrial contacts for student placement opportunities	-2.9	5.8
21a. Industrial contacts for obtaining occupational information, employment trends, and persons to speak to student groups	7.2	10.9
21b. The Counseling and Guidance Service includes industrial contacts for obtaining occupational information, employment trends, and persons to speak to student groups	0.6	6.5
22a. Career development courses	8.3	8.7
22b. The Counseling and Guidance Service includes career development courses	4.2	5.4
23a. Analysis of student data	11.5	7.8
23b. The Counseling and Guidance Service includes analysis of student data	10.1	8.8

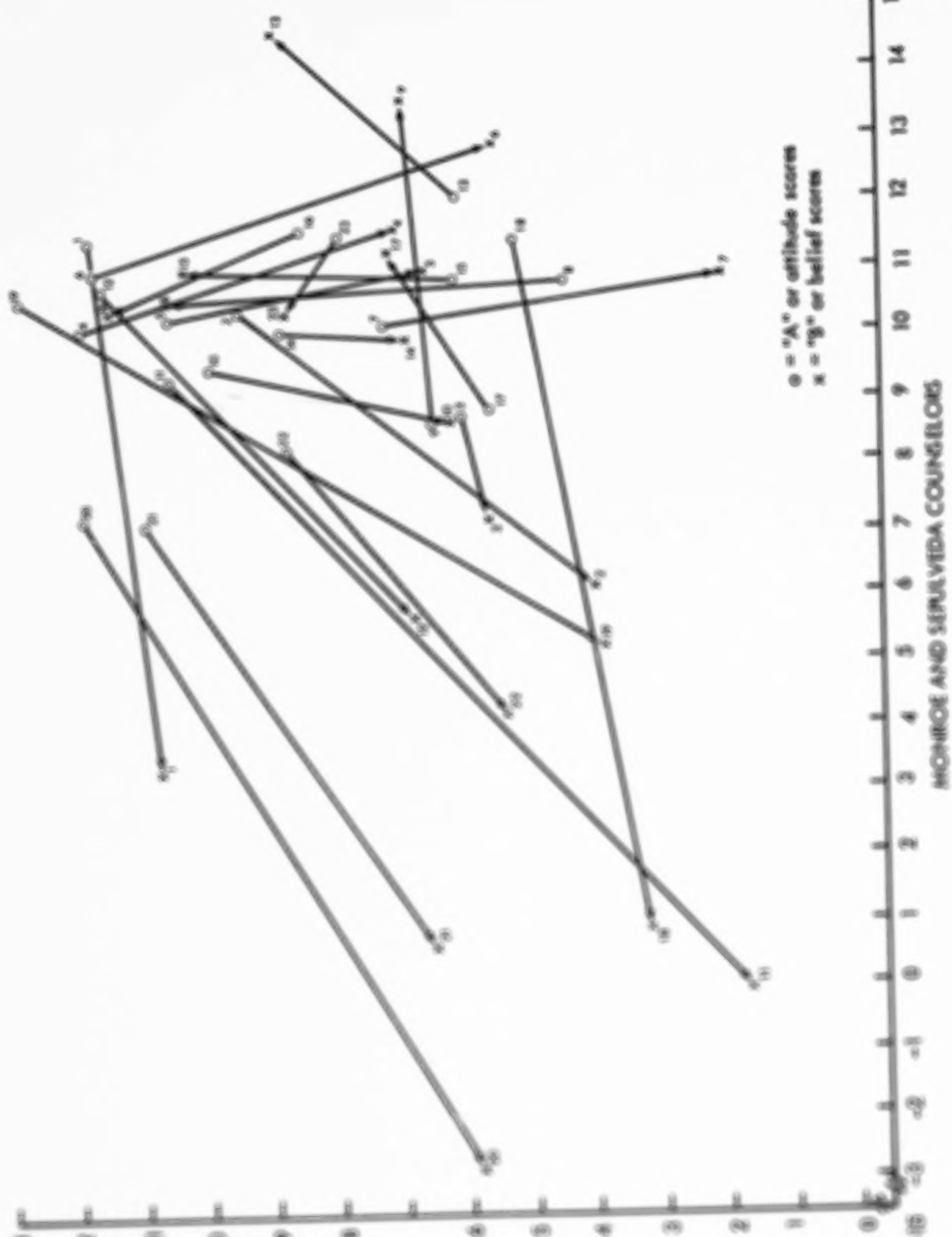

Figure 9-1. AB Scores

The two groups were much more in agreement regarding the belief aspect of the scales, i.e., the probability that a given characteristic exists in the counseling and guidance services ($r = .54$). This correlation seems to indicate that while their values are different, the groups concur in their perception of what is going on, even though one group is in the field and the other is in an academic setting. Certain of the areas covered deserve further comment.

Both groups viewed items 1, 4, 6, and 12 very positively. These items deal with the student directly, and the inferred interaction between the student and his parents, his teachers, and his curriculum. The school counselors felt that their activities included all of these except the area of curriculum evaluation and planning. The UCLA group believed that with the exception of individual counseling, the probability of the realization of the other activities was low.

The school counselors appeared to be more data oriented than the UCLA group. They viewed testing and the subsequent analysis and maintenance of student data as important for helping the student identify areas in which he might be successful (items 8, 13, 15, 16, 18, and 23). Information known to the authors from the analysis of the counseling organization at the two secondary schools indicates that while these activities are viewed positively, they are certainly time consuming. (It might be inferred that the positive attitude toward computer technology is based on the premise that the computer could be used to lift the information processing task from their shoulders, allowing them to spend more time in direct contact with students.) With the exception of identifying skills, aptitudes and interests, these activities all had a high probability of existence.

With regard to their overall range of response, the UCLA group placed a low evaluation on all of the activities mentioned above. Nevertheless, without exception, they placed a high probability on their existence. One might wonder whether they feel trepidation about preparing for a profession where they believe there are great discrepancies between what they consider important and what actually takes place--and, in fact, they do!

There are also divergences between the groups on the items having to do with industrial contacts for obtaining information and placement opportunities. The UCLA group evaluated the activities positively and believed that they probably take place in most counseling programs. The counselors from the two schools did not attach much regard to the activities, and in their own operational setting they do not engage in them. Little within-group conflict is expressed on these items, but a gap is apparent between the academic and the operational setting, both in terms of attitude and belief.

The split between the groups on the remaining items is less specific, but it nonetheless expresses some value differences that exist and that have a bearing on the topic of vocational guidance. The UCLA group took a positive view of contacting other agencies, helping students obtain financial aid through scholarships and jobs, tracking student performance and conducting follow-up studies, along with group counseling and career development courses. But, again, it is noteworthy that their belief in the probability of the activities existing in the school was low.

The school counselors took a somewhat less positive feeling toward these items. The difference seems to be that, in a group of items such as those (which seem to be related to helping a student through a variety of interrelated situations over time), the counselors viewed positively those activities that could be achieved within the confines of the data and resources presently available at the school: group counseling, financial assistance of students through jobs and scholarships, transfer of student information to teachers and parents, and monitoring of student performance. The school counselors rated these activities, with the exception of the last two, as having a low probability of existence. Neither group viewed items 3, 9, or 17 positively. Yet case studies, registration, program changes and requests, and report writing have a high degree of incidence in the high school program and were rated highly by both groups on the belief aspect.

The analysis of these data indicates wide differences between the academic group and the school group in valuations expressed. The counselors still receiving instruction appear to view the task in accord with the view of the professional: Clerical duties fall outside their domain; undue emphasis on data manipulation is "dirty"; and major concern should be placed on the student and the factors that impinge on him most directly, i.e., his curriculum, his teachers, and his family. Due consideration should be given to those activities that enhance his positive interaction with these factors.

In the operational setting we find counselors expressing a view that differs primarily in degree. Clerical duties remain a frustration, and their primary concern is with the student and his interaction with the factors that presently have most influence on him. However, their concern for enhancing this interaction is directed toward helping the student in an information-giving way.

The similarity of responses on the belief aspect, in a sense, underscores the divergence of the groups' responses on attitudes concerning the various counseling functions. These two findings, it seems, are of central importance to the problem of developing a valuable vocational counseling program within the school. There is agreement between the academic community and the school on what is being done. Yet a type of "fallout" seems to occur when theory becomes implemented and the operational setting imposes its restraints, such that the ideals shift. The constraints that the setting imposes on the school counselor seep into his perception of his role and he comes to redefine himself and his values in terms of the school situation.

During the measurement of counselor attitudes and beliefs described above, the group of counselors-in-training expressed views that were quite in accord with the balanced view of the professional in counseling. The functions they evaluated positively, when placed in the proper pattern, could quite conceivably allow the same development of vocational competence to which various theories of career development have referred. However, it appears that the counselor training programs place more emphasis on personal adjustment counseling per se than on considering vocational guidance an integral part of a student's personal adjustment and development. What is offered in vocational guidance at the university, then, is often viewed as separate from the continuity of the rest of the program. Thus it may well be that while the group of counselors still in training viewed positively the correct pieces of the puzzle, they were unaware of their relatedness in terms of the theory of vocational development. Taken one step further, when counselors-in-training are removed from the professor (who has impressed upon them the importance of occupational information and taught them the ins and outs of the Occupational Outlook Handbook), they are quick to note the students' lack of interest in such topics and are likely to succumb to inactivity when it comes to maintaining and updating the information. Still further, the counselor often lacks interest in, or knowledge of, jobs outside the professions. (There may well be, then, a solid foundation for the complaint often heard at the high school level--that the college-bound student receives the most assistance. Clearly, in this context, he is the easiest to handle.)

Thus inadequate, and occasionally inappropriate, counselor training is a contributing factor to the degeneration of vocational guidance theory from the academic to the operational or school setting. The training program must be the backbone of any effort to change: The program should be analyzed in an attempt to determine how unity of the various aspects of counseling (personal, educational, and vocational) could be achieved. Further, counselors-in-training should leave the academic setting with some clear practical notion of how to help the student achieve those goals established by career development theory--namely their own readiness to develop a plan of action with the confidence necessary to carry it out.

Among the career development theorists, Tiedeman and O'Hara have noted that little research has focused on how early identities are integrated into the new identity; they suggest that the vocational counseling function is crucial for successful integration. This approach to personality and career puts great emphasis on sincere and continuous support from society. To truly understand the interaction, they maintain that a matrix that will show measures of (1) the culture, (2) the student's perception of the culture, (3) the student's perception of himself in the culture, (4) perceptions of the student by key people, and (5) objective measures of the student.[5] They go on to say that the evolving ego identity creates a number of premises, the combination of which forms an attitude about one's self in one's world. This emerging psychological view can be spoken of as a person's cognitive map of himself in the world. The elements of the map are within a person's awareness. But the anger, joy, certainty, fear, doubt, shame, envy, and guilt surrounding many of the premises are not necessarily fully appreciated by the person. These emotional concomitants of premises are not easy to know[6] or to control. Usually we merely help a person to see them a little for himself.

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[5] Tiedeman, David V., and O'Hara, Robert P. Career Development: Choice and Adjustment. Princeton, N. J.: College Entrance Examination Board, 1963, p. 55.

In the introduction to their essay, these researchers wrote that, although the student's situation may remain unchanged when discussed in the counseling situation, his experience may change, as one reacts within a system of attitudes. Reflections and discussions can alter the meaning of an event for a person.[7]

Since nearly all human conduct is either in relation to other persons or affected by others, personality is essentially a social phenomenon. Further, sociological research indicates that the social behavior of youth (performance in school and on the job, recreation patterns, cliques joined, behavior vis-à-vis dates and sex), is functionally related to social class.

These citations and generalizations offer a clue as to how the major aspects of the theory could be implemented within the constraints of most schools. It is possible that a counselor, using group counseling techniques with a heterogeneous group of students, could encourage students to confront each other with the problems of living. They could then gain from each other an understanding of how their attitudes have colored their experiences of events in the culture. Discussions could be used to alter the meaning of an event for a person, ultimately making him aware of what his identity is. It seems that the student might then be in a position to initiate action as well as viewing his decision in relation to these values and these premises.

If counselors could employ this technique, using the adjunct of the available information system (preferably, but not necessarily, computer-based), the student might then be encouraged to use these reality-based facts/data to develop a vocational self-concept incorporating his own conception of likeliness.

In conclusion, the data presented suggest that the academic ideal of vocational guidance theory does fall apart in the operational setting. The question to ask next is not "What is vocational guidance?" but "Can we make it work?"

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[6] Ibid., p. 37

[7] Ibid., p. 8.

D. FOLLOW-UP OF THE MONROE COUNSELORS' ATTITUDE TOWARD COUNSELING

The Fishbein AB Scales were administered to the high school counselors again, June 1967, one year after the initial administration of the Scales.

No appreciable shift in attitude was apparent (i.e., both the A and B Scales are comprised of five, seven-place bipolar adjective scales, such that each b_i and a_i could range from -15 to + 15). A shift is taken to mean a shift from one scale to another (see Table 9-2).

However, differences are apparent for the belief scales. The belief scores increased for statements 2 and 16--the belief that the counseling and guidance service includes group counseling and computer technology respectively. The validity of this finding is indicated by the research staff's involvement with these two activities at the school over the past year.

The belief scores decreased for statements 3, 11, and 19--the belief that the counseling service includes case studies of students, follow-up studies of students after graduation or dropout, and helping students obtain financial aid through scholarship and jobs, respectively. With the exception of the latter statement, these items were initially given a positive attitude rating and a low belief rating. One year later, the belief rating had dropped to a negative rating. It is our impression that this decrease can be attributed more to the counselors' increased awareness of what they are doing due to their involvement in the training and design meetings, than to an actual decrease of time spent in pursuing these activities. The decrease in the belief rating for statement 19 might be best explained by the additional part-time grade counselors added to the staff. Rather than less time being spent assisting students with financial aid, the mean rating has probably been deflated by the addition of counselors who are not involved in the activity.

When we take both the belief and evaluative aspects into account, we note additional changes. It will be recalled that overall attitude toward counseling, as measured by Fishbein Scales, is a function of the person's beliefs about the object and the evaluative aspect of those beliefs. Algebraically, a negative rating on one scale and a positive rating on the other scale will result in decreasing the overall attitude toward the concept. On the other hand, if both scales are rated positively--or negatively--the overall attitude toward the concept will be increased, i.e., $A_o = \sum_{i=1}^{N} B_i a_i$. Such differences in attitude and belief are noted for items 3, 7, 9, 11, 12, 18, 19, and 20. The increase in the belief rating for group counseling has already been discussed. The overall effect of this change has been to place the belief aspect more in accord with the evaluative aspect. The statement including curriculum evaluation and planning has followed the same trend. The belief rating has increased, thus making it more in agreement with the positive evaluative aspect. The increase in rating is likely to be attributed to the increased contact the counselors have with teachers as a result of the publicity this project has generated in the school, and, more specifically, through their discussion of curriculum with teachers as an outgrowth of the contact generated by the group counseling.

Computer technology in counseling was originally given a high evaluative rating and a low belief rating. The evaluative rating has tended to decrease as the belief rating has increased. The net effect has been for the two ratings to be more in agreement. The increase in the belief rating has been previously discussed. The lower evaluative rating might best be explained by the SDC staff's increased emphasis on developing humanistic procedures with the concomitant emphasis on the counselors' role in the system, rather than on the computer aspect.

The attitude and belief ratings toward follow-up studies of students after graduation or dropout and toward industrial contacts for student placement opportunities remained out of agreement. On the former activity, the belief rating dropped further, as discussed previously. On the latter activity, both the attitude and belief ratings demonstrated a slight increase, with the net result that the probability of existence, remaining negative, does not coincide with the evaluative aspect. At present then, there is little activity directed toward helping the student make the bridge between school and work, or keeping track of what happens to students after they leave the school setting.

Several additional discrepancies between attitude and belief toward counseling activities emerged on the second administration of the AB Scales, notably, for items 3, 5, 9, and 19. The lack of agreement has increased for case studies of students, due to the decrease in the belief rating already discussed. The evaluative rating has increased for the transfer of student information between counselor and teacher; however, the belief rating has decreased. This finding, again, might best be attributed to the counselors' increased awareness of what they are doing as a result of their participation in this project, and the concomitant sensitivity to the inadequacies of the counseling service. In point of fact, the interaction they do have with teachers has tended to become more meaningful with respect to increased understanding of their dual objectives, through their involvement with group counseling, such that there has been a real desire expressed for better communication.

The evaluative rating for registration, schedule changes, program requests, and transcripts has decreased appreciably, while the belief rating has remained highly probable. This finding indicates an increased distaste for an activity that takes a large segment of their time. Our involvement with the counselors has stressed the fact that the computer provides a valuable means for assuming routine data processing tasks. These discussions have likely influenced their evaluative rating--why should they spend their time on an activity that relates to counseling only in a peripheral sense, and is necessary only for the schools' record-keeping responsibility, when it might be done by computer?

The discrepancy between attitude and belief with respect to helping students with financial aid is attirubted to the lower belief rating discussed above.

The correlation between the estimated attitude and belief toward counseling at the school ($\sum_{i=1}^{22} B_i a_i$) and the obtained (A_o) is .77, indicating the validity of the above findings as being characteristic of high school counseling. The correlation was .56 for the follow-up analysis.

C. FOLLOW-UP OF THE SEPULVEDA COUNSELORS' ATTITUDE TOWARD COUNSELING

For the Sepulveda Junior High School counselors, there was a change on the attitude rating for two characteristics, items 2 and 3 (see Table 2-4). Group counseling was evaluated less positively on the second administration of the AB Scales. This finding seems attributable to the counselors' changed perception of group counseling and their decisions that this activity entails counseling in a personal dimension, which they do not view as part of their conception of counseling (See Part III, Chapter 7, p. 3). Their evaluative rating for registration, schedule changes, program requests, and transcripts increased (as opposed to the decrease at Monroe). It is our opinion that the Sepulveda counselors, in defining their role strictly in the educational and vocational realm, see this characteristic of counseling as pertinent to fulfilling their definition of counseling.

The belief rating increased for items 10, 16, and 22. The counselors now perceived that they were spending more time contacting other schools and agencies to assist the student, tracking student performance, and, to a lesser degree, teaching career development courses. The increase in the former two activities might best be attributed to the increased data processing capabilities they presently have as a result of the center instituted by the Los Angeles Public School System during the past year. The increase of the latter activity is self-explanatory: An increased emphasis has been placed on vocational counseling at the junior high level.

A lack of agreement between attitude and belief rating is evident for items 3, 11, 16, 19, 20, 21, and 22. On the initial administration of the AB Scales, registration, schedule changes, program requests, and transcripts had a low evaluation rating but a high belief rating. As already discussed, the evaluative rating has since increased, eliminating the lack of agreement.

The lack of agreement for follow-up studies of students after graduation or dropout was evidenced from both analyses. Most probably, the explanation for this finding is readily explained because this activity is not a concern at the junior high level, even though it is evaluated positively.

In the initial analysis, the identification of skills, aptitudes, and interests to allow students to make decisions about occupational goals was evaluated positively but given a low probability of existence. The increase in the probability rating seems attributable to the increased emphasis on the career development course, wherein students become involved in the occupational decision-making process.

Table 7-8. Follow-Up of Counselor Attitude Toward Counseling
(Comparison of 1966-1967 Scores)

	School			
	MONROE		SEPULVEDA	
	1966	1967	1966	1967
1a. Individual counseling	11.6	10.8	11.4	13.0
1b. The Counseling and Guidance Service includes individual counseling	13.4	10.9	13.0	10.3
2a. Group counseling	10.6	9.1	10.8	6.6
2b. The Counseling and Guidance Service includes group counseling	5.6	11.9	10.3	9.4
3a. Case studies of students	8.3	9.7	9.6	11.6
3b. The Counseling and Guidance Service includes case studies of students	7.0	<5.8	11.8	13.0
4a. Teacher-counselor conferences	9.8	10.1	10.6	11.8
4b. The Counseling and Guidance Service includes teacher-counselor conferences	10.9	9.7	13.0	12.0
5a. Transfer of student information between teacher and counselor	10.8	10.3	10.6	11.0
5b. The Counseling and Guidance Service includes transfer of student information between teacher and counselor	9.3	7.8	10.0	13.0
6a. Parent-counselor conferences	11.3	12.0	10.4	11.0
6b. The Counseling and Guidance Service includes parent-counselor conferences	13.0	13.0	12.6	10.4
7a. Transfer of student information to parents	11.6	8.1	7.4	10.0
7b. The Counseling and Guidance Service includes transfer of student information to parents	10.9	11.4	11.0	12.6
8a. Test administration, scoring, and recording	10.8	9.6	10.0	9.0
8b. The Counseling and Guidance Service includes test administration, scoring and recording	10.3	12.0	10.0	12.0

Table 5-6. (Cont'd)

		School			
		[illegible]		[illegible]	
		1966	1967	1966	1967
9a.	Registration, schedule changes, program requests, transcripts	10.3	8.1	5.4	10.0
9b.	The Counseling and Guidance Service includes registration, schedule changes, program requests, transcripts	14.9	14.7	11.0	15.0
10a.	Contacts with other schools and agencies to assist student	10.9	9.8	7.0	10.0
10b.	The Counseling and Guidance Service includes contacts with other schools and agencies to assist student	10.8	9.6	5.6	10.6
11a.	Follow-up studies of students after graduation or dropout	9.6	8.6	9.8	9.0
11b.	The Counseling and Guidance Service includes follow-up studies of students after graduation or dropout	4.2	<4.6	<7.4	<7.2
12a.	Curriculum evaluation and planning	10.4	8.4	11.4	11.6
12b.	The Counseling and Guidance Service includes curriculum evaluation and planning	6.6	7.2	7.8	6.6
13a.	Student cumulative folders	12.3	12.4	12.0	12.8
13b.	The Counseling and Guidance Service includes student cumulative folders	14.5	14.3	13.0	15.0
14a.	Tracking of student performance	10.1	11.4	9.6	11.2
14b.	The Counseling and Guidance Service includes tracking of student performance	11.8	10.6	9.0	15.0
15a.	Test interpretation to enable students to make decisions as to success in particular courses or programs	10.9	11.2	11.0	11.8
15b.	The Counseling and Guidance Service includes test interpretation to enable students to make decisions as to success in particular courses or programs	10.9	9.6	11.2	15.0

Table 9-2. (Cont'd)

	School			
	MONROE		SEPULVEDA	
	1966	1967	1966	1967
16a. Identification of skills, aptitudes, and interests so that students can make decisions about occupational goals	11.8	11.7	11.8	11.6
16b. The Counseling and Guidance Service includes identification of skills, aptitudes, and interests so that students can make decisions about occupational goals	10.6	11.0	6.4	9.6
17a. Placement, scholarship, test or status reports	9.7	8.2	7.8	7.8
17b. The Counseling and Guidance Service includes placement, scholarship, test or status reports	13.8	10.8	8.0	9.0
18a. Computer technology in counseling	11.4	8.0	11.4	11.4
18b. The Counseling and Guidance Service includes computer technology in counseling	<3.4	7.7	8.8	10.8
19a. Financial aid to students (scholarships, jobs)	11.6	10.9	9.8	10.6
19b. The Counseling and Guidance Service includes financial aid to students (scholarships, jobs)	10.8	4.4	<7.4	<7.0
20a. Industrial contacts for student placement opportunities	7.3	10.3	7.4	7.8
20b. The Counseling and Guidance Service includes industrial contacts for student placement opportunities	8.8	5.3	<12.0	<13.4
21a. Industrial contacts for obtaining occupational information, employment trends, and persons to speak to student groups	6.8	8.1	8.0	9.4
21b. The Counseling and Guidance Service includes industrial contacts for obtaining occupational information, employment trends, and persons to speak to student groups	4.5	5.8	<3.6	<3.0

Table 5-4. (Cont'd)

		School			
		MONROE		SEPULVEDA	
		1966	1967	1966	1967
22a.	Career development courses	8.7	6.5	7.8	8.0
22b.	The Counseling and Guidance Service includes career development courses	6.8	9.3	-0.4	7.0
23a.	Analysis of student data	11.8	10.6	12.0	11.6
23b.	The Counseling and Guidance Service includes analysis of student data	8.7	10.8	12.6	14.0

Positive evaluative ratings were given to assisting students with financial aid, making industrial contacts for student placement opportunities, making industrial contacts for obtaining occupational information, charting employment trends, obtaining persons to speak to student groups, and conducting career development courses. However, these activities all had low belief ratings because they are generally viewed more as aspects of high school counseling rather than of junior high counseling. With the exception of career development courses already discussed, the low belief ratings have persisted.

An additional lack of agreement between attitude and belief ratings existed during the second administration of the Q3 Scales for curriculum evaluation and planning. The evaluation rating has remained positive, but the belief rating has decreased. It is difficult to infer whether the counselors are, in effect, spending less time on this activity, or whether the decrease is due to their increased awareness of what they are doing as a result of their participation in the study.

For the Sepulveda counselors, the correlation between the estimated attitude and belief toward counseling at the school (i.e., $\sum_{i=1}^{n} B_i a_i$) and the obtained attitude (i.e., A_o) was .21 during the first administration of the Scales, suggesting that many of the items are probably not characteristic of counseling at the junior high level. The correlation increased to .78 during the last analysis. The increased correlation might best be attributed to the lesser number of discrepancies between attitude and belief on the last analysis, which, in turn, might be attributable to the counselors' involvement in the training and design meetings and their increased awareness of what they are doing and what they view as important.

B. COUNSELOR ACTIVITY TIME LOG

We developed an activity time log to assess the effect of implementing new procedures in the counseling system. This section describes the rationale for, the development of the form, the sampling procedure used in collecting the data, and the results of the data collected during the last 12 weeks of the Spring 1967 semester. A following report will assess the effects the new system has had on the reallocation of counselor time.

The activity time log was constructed to include the major activities in which counselors appear to be presently engaged, as well as those we could assume might emerge from the implementation of the new system. The log was derived from a review of the problems counselors said they were encountering, and their design ideas for the future system (see Part I). We compiled a list of activities (see Appendix E), listed in order of general to specific, with the latter items (activities a-e) designed to describe the specific activities involved in carrying out the more general function, i.e., making telephone calls might describe the specific activity spent pursuing the general function of making contacts with parents.

We constructed an additional form to clarify the nature of individual counseling. This form included items on the nature of the interview, who initiated the interview, who was present in the interview, and the duration of the interview. (See Appendix F.)

We then discussed these two forms with the counselors to solicit their opinion as to the comprehensiveness and applicability of the forms to the two schools in question. Further, we wanted to assure them that we were in no way interested in evaluating the way in which they spend their time. We wanted to make it clear that we needed to get some estimation of how they were spending their time now so that we could have a base by which to compare how they would be spending their time after the system was implemented. The forms were revised in accordance with the feedback we received from the counselors.

With respect to the counselors, we also wanted to obtain these data in the manner that would be the least disruptive to their schedule, and still give us the information required. We decided that it would be impossible to collect this information on a daily basis, but that the nature of their activities was often predicated on the time of the school year. This information precluded an extensive data collection effort within a short span of time, so we decided to make sample data collections throughout the semester, on a [illegible], rotating days, schedule. In addition to filling out the activity time log, the counselors also agreed to fill out the individual interview form for each student seen on that day.

Table [illegible] includes the mean times for each of the items for the [illegible] counselors at the high school and the five counselors at the junior high.

Monroe High School has [illegible] counselors working full time, [illegible] working three hours per day, and [illegible] working two hours per day, making [illegible] counselor hours per day available for a student population of approximately [illegible]. Sepulveda Junior High School has a total of [illegible] counselors, [illegible] working full time and [illegible] half time, for a total of [illegible] counselor hours per day available for approximately [illegible] students. Since the counseling functions at the junior and senior high schools are quite different, a comparison of the two schools is inappropriate. Rather, the discussion involves the relative time spent on a particular activity in comparison to the other activities on which the counselors spend their time.

In terms of the major functions of counseling (activities [illegible]), most time at Monroe is spent on individual counseling; however, the significance of the time spent on this activity is tremendously deflated when it is looked at in terms of the total hours spent. Here, while approximately [illegible] counselor hours are available per day, only [illegible], or approximately [illegible] percent of these, are used for counseling students. The rest of the time is spent on other activities associated with the counseling service.

Table 3-5. Mean Time per Counseling Activity
(in Minutes)

Activities	School	
	[illegible]	[illegible]
a. Individual counseling	40.40	37.29
b. Group counseling	7.40	13.98
c. Contacts with parents	10.75	17.40
d. Contacts with teachers	16.05	13.23
e. Contacts with other school officers	12.30	10.00
f. Contacts with outside agencies, industry, etc.	2.78	1.75
g. Meetings with other counselors	9.36	7.0
h. Tracking student performance	10.32	.40
i. Conducting case studies	0	0
j. Helping student obtain financial aid, scholarship, placement	5.60	1.2
k. Assisting students in college entrance	8.86	0
l. Curriculum evaluation and planning	6.77	18.08
m. Professional training	8.03	8.0
n. Research or prediction	0	5.0
o. Using automated (computer) system	0	.30
p. Test interpretation	4.03	0
q. Analysis and interpretation of data	2.78	9.23
r. Writing letters, reports, preparing lists	13.86	2.73
s. Checking and recording data (cums, etc.)	13.93	11.0
t. Course programming, scheduling, registration	41.03	27.20
u. Identifying special group (failing, gifted, etc.)	5.86	6.75
v. Reading reports, professional literature, etc.	6.87	.37
w. Supervising student help	8.10	1.08
x. Distributing forms, lists, packets, etc.	3.10	3.75
y. Telephone	12.32	3.33
z. Non-counseling activities (duties, etc.)	3.77	13.00
Other	13.10	6.0

Significantly less time is spent contacting parents, other school offices, and teachers. Again, with approximately 30 counselor hours per day available, a total of approximately 2 hours is spent on these three activities. Thus, only 10 percent of their time is spent coordinating the activities of the counseling section with the rest of the school or communicating with parents.

Notable here is the sharp rise in parent contacts at the end of the semester, and the rise in teacher contacts around the time report cards or D, Fail, and F lists are sent out. Additionally, it is noted that the head counselors assume most of the responsibility for making contacts with other school offices.

The next two functions of highest order are handling student performance and helping students with college entrance. In combination, these two activities entail about 8 percent of the available hours.

With little exception, there is a sharp division of function with respect to these two activities, with the full-time counselors having major involvement in handling student performance, and a college advisor handling the bulk of college entrance counseling.

The time spent meeting with other counselors is hard to assess in the same manner because the very activity involved is done in conjunction with another staff member. Thus, the mean times for each counselor cannot be summed and compared to the total time available during the day. Neither can it be viewed as being interactive among all counselors. One observation that is apparent is an interactive effect between the number of hours a counselor works and the time spent meeting with other counselors. At the top extreme is the head counselor spending much of his time in meeting with other counselors. Overall, however, each counselor spends approximately 4 percent of his time meeting with other counselors.

The mean time accorded group counseling is about 3 percent of the total counselor hours available. This figure is somewhat low, considering that 4 of the 10 counselors each has a group that meets once a week. The sampling procedure used, however, would not necessarily include days in which group counseling took place, thus the actual figure would be approximately 7 percent.

Curriculum evaluation and planning involves approximately 3 percent of the total hours available. This activity is heavily oriented to the time of the semester and to full-time counselors. However, this function may most probably be assessed to focus on the counseling rather than the educational program.

The time spent contacting outside agencies and industry is approximately equal to 2.2 percent of the day's time. These include luncheons that the head counselor is invited to by local universities and business, and the contacts made for job placement.

Approximately 2 percent of the total counseling hours available are spent helping students obtain financial aid, scholarships, and placement. Again, this is done almost solely by the college placement counselor, with the prime activity taking place in the third quarter of the semester.

The counselors spend less than 1 percent of their time on professional training. The counselors frequently spend Tuesday afternoons listening to their tapes from the group counseling sessions, and learning new group counseling techniques with a trainer from the district. Since this activity was always conducted at [illegible], the sampling technique employed often did not pick it up. However, [illegible], the activity took up little of the counselor's total time, realistically being about 2 percent.

No time was spent conducting case studies with students, on research or prediction, or on using the man-machine counseling system.

A final category ("Other") was added to include functions for which the counselor is responsible, but which may occur randomly and without notice. Such activities account for 9 percent of their time—an appreciable amount when it is considered that the above functions accounted for a total of 71.2 percent of their time. Included in this category were activities such as supervising, making visits to the junior high school, "outside counseling," giving out test scores to groups of students, attending field trips and workshops, observing video tapes, assembling schedules, covering classes.

In total, then, the time spent on these functions equals approximately 73.2 percent of the total counseling time available. The remainder of the time is spent on routine clerical and data processing tasks, many of them essential to the successful completion of the functions cited above.

By far the most time-consuming of these activities is course programming, scheduling, and registration. Next to individual counseling, this is the second most time-consuming task of counselors, taking up approximately 12 percent of the total available hours. This activity is especially heavy during the third quarter of the semester, understandably, as the students prepare their programs for the coming semester. However, its continuation throughout the semester indicates that it is an activity that requires continuous adjustment.

The time spent on the telephone accounts for approximately 7 percent of the available counseling time. It may be assumed that this encompasses the main form of parent contact.

Writing letters and reports, preparing lists, and checking and recording data involve approximately 12 percent of the counselors' time.

Noncounseling activities take up about 5 percent of the time available. Each school must have its candy drives, the supervision of student clubs, the department meetings, the seniors' breakfast and dinner, a little "goofing off." If a less time-consuming nature are activities such as supervising student help (1.7 percent), reading reports and professional literature, etc. (2.9 percent); analyzing and interpreting data (1.6 percent); distributing forms, lists, and packets (1.4 percent); and identifying special student groups, i.e., fails, gifted, etc. (1.3 percent).

The latter routine activities take up about 36 percent of the total time available. While many of these activities are necessary in the fulfillment of the initial category of activities discussed (a-e), and overlap between the latter and former is possible, the time involved does point up the fact that counselors are saddled with a lot of routine tasks that must be accomplished before they even get around to accomplishing their major functions.

For the Sepulveda Junior High School, individual counseling remains the highest-priority function. But again, with approximately 20 counselor hours available per day, individual counseling accounts for only approximately 11 percent of the time available.

Contacts with parents, teachers, and other school offices accounts for an additional 12 percent of their time. Contacts with parents are made about equally by all the counselors. Contacts with teachers are made by all counselors, but especially by the head counselor, and contacts with other school offices are made almost exclusively by the head counselor.

Group counseling is handled primarily by the head counselor. For the junior high, the function generally means giving a particular sort of information to a class of students. It entails approximately 4 percent of the total time available to counselors. Curriculum evaluation and planning figure next in time allotment, comprising another 3.6 percent of the counselor time. Again, it is done almost exclusively by the head counselor, and may be assumed to involve the counseling program rather than the instructional program.

Professional training is a sporadic activity, generally pursued by the head counselor, but sometimes involving the total staff. It takes up about 2 percent of their time. Meetings with other counselors are participated in about equally by all members of the counseling staff, and amount to approximately 1 percent of their time. Contacting outside agencies and industry, and helping students obtain financial aid, scholarship, or placement, together comprise approximately another 1 percent of their time; somewhat understandably, the educational needs of the junior high students are confined primarily to the school. Conducting case studies, tracking student performance, research and prediction, and using the computer system are all negligible in time at the present.

Another 2 percent of the counselors' time is taken up with activities that are infrequent in nature. These include contacting absentees to give them homework assignments, correcting papers, interviewing students for civic-sponsored conferences, and conducting leadership conferences. In total, these functions comprise about 36.6 percent of the available counseling time.

Much of the counselors' time, however, is taken up by activities that may be assumed to be adjuncts to the above functions. These activities are more clerical and routine in nature.

Course programming, scheduling, and registration figure prominently in this category, entailing about 8 percent of their time. Checking and recording data, writing letters and reports, and preparing lists consume another 6 percent of the available time, and occur most frequently during and immediately following the third quarter of the semester. Noncounseling activities are the next biggest time consumer, taking up to 4 percent of the counselors' time. Supervision, mainly by the head counselor figures most prominently here. In decreasing rank order, analysis and interpretation of data, distributing lists, packets, etc., and making telephone calls account for another 1 percent of the counselors' available time. Supervising student help, reading reports and professional literature, and test interpretation are negligible in time.

These activities comprise another 19 percent of the total time allocated to counselors. In summary, the total list of activities account for only 55.6 percent of their time.

E. STUDENT INTERVIEWS

At Monroe, a total of 629 interviews took place on the 12 days the counselors filled out the activity time log. Each of these interviews lasted an average of 10 minutes. Of these interviews, 323 interviews were initiated by the student, 281 were initiated by the counselor, and 20 were initiated by someone other than the student or counselor, i.e., a parent, another school officer, or teacher. Most of the interviews were private conferences between the student and counselor, although a smaller number (13) were attended by another student or school personnel.

Table 9-4 gives a breakdown of the topics discussed in these interviews.

Table 9-4. Subject of Interview

Subject of Interview	No. of Students Seen	Percentage of Total
Course programming	270	26.1
Change of program	165	15.9
Discussion of credits	57	5.5
Discussion of test scores	46	4.4
Discussion of grades	97	9.3
Acceleration	43	4.1
Occupational planning	35	3.3
Postsecondary educational planning	113	10.9
Scholarships	12	1.1
Personal	103	10.9
Other	93	9.0
Total	1,034*	99.6

*It was possible for an interview to cover more than one topic, hence, the total of 1,034 rather than 629.

At Sepulveda, a total of 169 students were seen during the time spent on individual counseling. These interviews lasted an average of 12 minutes each. The greatest percentage of the interviews (75 percent) were counselor-initiated, 16 percent were initiated by the student, and 9 percent were initiated by someone other than either the counselor or student, i.e., the girl's or boy's vice principal, parent, or teacher. None of these interviews included anyone other than the student or counselor.

Table 9-5 presents the major topics discussed in the interviews.

Table 9-5. Subject of Interview

Subject of Interview	No. of Students Seen	Percentage of Total
Initial interview	11	3.9
Change of program	3	1.1
Discussion of grades and academic progress	83	29.8
Programming-gathering information	25	9.0
Programming-imparting information	47	16.9
Unsatisfactory behavior	26	9.3
Discussion of test scores	14	5.0
High school planning	23	8.2
Acceleration	5	1.8
Personal	11	3.9
Other	31	11.1
Total	279	100.0

The most noticeable aspect of topics discussed in individual interviews for both schools is the preponderance of interviews that are primarily of an information-giving nature. In comparison, the time spent on either education or vocational planning or problems of a personal nature is negligible. Once again, the data indicate that information-giving remains expressive of what counseling involves at both the junior and senior high school levels. Future evaluation will help to assess whether the implementation of the system will change the situation to one in which the ideal objectives of counseling will be met for students.

PART V

SUMMARY AND PLANS FOR PHASE II

A brief summary of the work conducted in Phase I is provided in Chapter XI. The objectives and procedures planned for Phase II are described in Chapter XII.

CHAPTER IX.

SUMMARY

I. PROCEDURES

Before embarking on the design of the SDC man-machine counseling system, we surveyed the guidance practices in thirteen schools distributed through seven states. The purpose of the survey was to study the variation in counseling practice among schools. This variation could then be considered in the system development work with the schools selected for the man-machine study.

Counselors at each of the thirteen schools were asked to describe how they were spending their time, and how they would like to spend their time in an ideal counseling situation. To do this they made two sorts of a deck of 93 cards, each containing a description of a discrete counseling activity. Analysis of these two sorts (actual and ideal) indicated no marked differences among counselors from different schools. However, the data do indicate a marked difference between what the counselors are doing and what they would like to do. As a group they would prefer to reduce greatly the amount of time they spend in routine information processing tasks--such as processing registration and schedule changes, handling program requests, analyzing routine data, recording data, writing reports, collecting and updating occupational information, and administering tests. They would prefer to increase the time they spend working directly with students in activities such as helping students explore their problems, feelings, or courses of action in group and individual counseling. They would like more time for follow-up studies, for working with administrators in curriculum evaluation and planning, and for conducting research. They would like to see an increase in the use of data processing equipment, presumably to lift the information-processing burden from their shoulders.

After the survey, an experimental field site was selected. The focus of system development and experimentation is a large school complex (junior high and high school) in the Los Angeles School District. The James Monroe High School has a population of 3,600 students and 12 counselors; the Francisco Sepulveda Junior High School has 1,800 students and five counselors. By interviewing all of the counselors, we obtained detailed system analysis of all the counseling procedures employed in this school complex.

The general flow of procedures was defined for each of the two counseling offices. In addition, the individual activities and procedures of each counselor were described, and the descriptions reviewed and verified by the counselors.

After the system analysis, the counselors visited System Development Corporation for three two-hour workshops on advanced information processing technology. Discussion and readings were combined with demonstrations of on-line computer applications.

Following the systems analysis and training, two design teams were formed to specify Model I of the system. One team consisted of the SDC researchers and the high school counselors; the other, of the researchers and the junior high school counselors.

A new procedure was used with the high school design team. A special consultant, Dr. [illegible] [illegible] from the National Training Laboratory, was employed to facilitate communication and participation while the team was engaged in the design process. His participation in the design sessions was judged very helpful by all members of the research team and by the counselors. A strong group identification was apparent, and all of the members of the team participated actively in the discussion. The ideas for the system that developed during the discussions were not simply those the researchers wanted to test, but rather, were the products of the design team--which included both the counselors and the research staff.

III. FUNCTIONS PLANNED FOR MODEL I

A number of major ideas for the man-machine system emerged from the design sessions. Those functions that are to be programmed for Model I are described below.

A. INFORMATION RETRIEVAL

All student information, including that currently contained in the student cumulative record (grades, test scores, teacher comments, etc.), as well as attendance records, health records, and counselor notes, will be stored. Retrieval will be possible using both on-line and off-line devices. This function will enable counselors to retrieve information for any student or population of students. In addition, a calculation capability will be provided for the computation of needed measures such as frequency counts, means, variances, etc.

B. TRACKING AND MONITORING

The computer will track students as they progress through school and will identify students who need the help of a counselor. The system will alert the counselor concerning:

- failure of student to meet requirements,
- change in student's pattern of achievement,
- failure of student to take electives that provide a chance for exploration, and
- other critical situations, prespecified by the counselor.

C. AUTOMATED REPORT GENERATION

The computer will automatically generate reports such as:

- report cards,
- progress reports,
- special reports to parents, and
- lists of athletes who are failing in classes.

D. PREDICTION AND RESEARCH

The counselor will specify the sample, and the dependent and independent variables. The computer will then generate the formula and give the counselor some indication of its validity. The counselor may then apply the formula to new samples to make predictions about the students, or he may test hypotheses about the generated model. Ideally, the counselor would not need to have any knowledge of mathematics or statistics; any mathematical or statistical operations would be performed by the computer.

E. AUTOMATIC REMINDERS

Counselors will be able to store messages in the computer to be output to them at later, specified times.

F. FOLLOW-UP DATA ON STUDENTS

Provision will be made for collecting and storing follow-up data on students who leave the high school and continue on to technical schools, junior colleges, or colleges, and those who discontinue schooling for work. These data will be available for the prediction and research system. A study of the procedures for collecting and using these kinds of data is being made at Los Angeles Trade and Technical College, where grades in trade and academic courses, high school grades, and aptitude test scores are being collected.

G. PROGRAMMED INTERVIEWS

Counselors will be able to refer students with special problems to on-line, programmed interviews. Interviews will be developed in the following areas:

- vocational information,
- college and scholarship planning, and
- special problems, such as deciding whether to take a particular course.

III. DEVELOPMENT OF SYSTEM COMPONENTS

Following the design meetings, work began on the development of the information processing components of the system, training of the counselors, and development and use of evaluation measures. The computer functions are being developed on the Q-32 time-shared computer system. Programming of the prediction and research system is in progress, and, in addition, a programmed interview for exploring occupational information is being developed. The high school counselors are presently participating in a training program in group counseling techniques in order to strengthen their skills in working with students.

Once the system is accepted and operating in the field, the results of other research projects can be reviewed and integrated into the ongoing system. The focus on implementation represents a concrete attempt at bridging the gap between theory and practice. However, it should not be assumed that the focus on current counseling practice in the SDC study will prohibit any change beyond allocation of some counseling tasks to the computer. The use of the computer in counseling should not only increase the amount of time that counselors can spend with students, but also provide an opportunity to strengthen the vocational information and the humanistic aspects of counseling.

The nature of the counseling relationship can also be changed. Much of the information-giving task can be assigned to the computer so that counselors will have more time to listen to students and to help them explore the meaning that information has for them. Also, the amount and the availability of vocational information can be improved. The computer-based system for exploring occupational information will require counselors to pool their information and make it more readily available to students.

IV. OTHER PHASE I ACTIVITIES

Data were collected during the spring of 1967 on the following variables for the purpose of providing a basis for evaluating the project:

- counselor attitudes toward counseling,
- student attitudes toward counseling,
- number of school dropouts,
- the allocation of counselor time to counseling activities, and
- the vocational maturity of students.

These measures were taken prior to system change to provide a basis for comparison with similar data that will be collected in 1969 when the system changes have been implemented. The Crites Vocational Development Inventory is being used and the results will be compared to data being collected by [illegible] at [illegible]. [illegible] of [illegible] were used to develop a measure of student and counselor attitudes toward counselling.

Eighteen graduate students in a course on counselling ethics at [illegible] have made an ethical analysis of the system plan. This analysis was studied and summarized and will be considered in the development of the system in the schools.

CHAPTER IV.

PLAN FOR PHASE II IMPLEMENTATION

I. OBJECTIVES

In order to implement and evaluate the man-machine system that has been designed in Phase I, the following objectives must be met:

- ○ The computer programs and the programmed interviews previously described must be developed prior to installation.
- ○ One interactive terminal must be installed in each of the two schools.
- ○ Counselors must be trained in the use of the system.
- ○ System development procedures, i.e., iterative system testing and system change, must be carried out over an extended period of time.
- ○ Post-system-change evaluation data must be collected, for comparison with the data currently being collected.
- ○ A document must be produced that describes the final system design resulting from the system development process. This document must include the computer program logic, the interview logic, the definition of the user language, and an evaluation of the system.
- ○ Recommendations will be made for adaptation of the system to semiautomated (off-line, computer-supported) and manual counseling operations.

II. STEPS

The procedural steps that are planned will be as follows:

A. DEVELOPMENT OF THE SOFTWARE SYSTEM

The software system will be developed as a number of separate programs or modules, rather than as one large program for all of the functions of the system. There are several reasons for this strategy:

- ○ The system will be subjected to repeated evaluation and revision. Modular systems are more tractable in evaluation-revision cycles than are monolithic systems.
- ○ The anticipated core requirements of the total software system far exceed the core memory capacity of the computer to be used. Consequently, the system must be constructed in such a way as to permit keeping some subsystems in auxiliary storage (disc or drum) until called for by other subsystems.

- The computers to be used in this study are very large, and will not be available to most schools for some time. Meanwhile, it should be possible to operate parts of the system on smaller machines.

The primary subsystems, listed in the order in which they will be implemented, are:

1. General Input-Output Routines and Input Processor

These are basic routines for use in input and output. They involve such functions as reading and writing on various input-output and storage devices (teletype, printer, cards, disc, tape, etc.); scanning; packing and unpacking; formatting; and determining the action of the input message (storage, retrieval, calculation, etc.).

2. Data Base Description and Construction

This subsystem permits input of data base description statements and the allocation of space, and construction of dictionaries and descriptive tables for a data base.

3. "Simple" Storage

These routines interpret storage statements, and as well as reading and storing information into a defined data base, but do not implement the use of input forms.

4. "Simple" Retrieval

"Simple" retrieval routines permit the retrieval of information from a defined data base by statements not involving output forms or derived data calculations.

5. Input Form Description and Storage Using Forms

Input forms permit prespecification of input formats and facilitate the input of large volumes of data. Input form description statements are used to describe forms; storage statements involving input forms cause the reading and storage of data according to the forms.

6. Output Form Description and Retrieval Using Forms

Output form descriptions define and name output formats. Retrieval statements employing forms may be used to prepare reports.

7. Define Statements

The "define" statements allow the user to make certain kinds of changes in the user language to simplify frequently used expressions or to satisfy special user requirements.

8. Calculation Statements

Calculation statements permit the retrieval of derived data (frequency counts, sums, means, etc.) as well as providing a "desk calculator" capability.

9. Time-Controlled Functions

These may be thought of as delayed retrieval functions--that is, retrieval that is not to occur until some time in the future, for example, tracking and monitoring, periodic report generation, and the "Reminder Secretary."

10. Prediction Routines

This system includes programs for generating regression formulas, testing hypotheses, and applying developed formulas to new student data.

11. Scheduling and Course Programming

Many scheduling programs already exist and it is hoped that one of them can be modified to fit into this system.

12. Programmed Interviews

These interviews will be developed using the PLANIT system. (PLANIT is a program developed at SDC for writing and executing lessons or interviews on a time-shared computer system.)

a. Exploring Occupational Information

This is an interview that helps the student explore basic information about various levels and families of occupations. The interview is designed to give the student freedom in choosing what he wants to explore. However, he can obtain help in choosing if he needs it. The interview refers him to outside reading available in his school library if he wants greater depth of information. A summary of the interview can be made for the counselor. The student can also retain a copy of the interview to discuss with his parents.

b. College and Scholarship Planning

Work on this interview has not been started. However, it will be designed to help the student obtain basic information about local and state colleges and direct him to other information on the shelf. It will also give him information about scholarships.

c. Special Educational Planning

A procedure is being explored that may retain many of the advantages of computer-controlled interviews while avoiding excessive cost. The PLANIT system is being used to approach the problem of helping a student decide whether to take algebra. PLANIT can be used to prepare off-line, individualized reports for each student, based on the student's aptitude and achievement scores, grades, and teacher recommendations. The reports will interpret the student's scores and advise him regarding the probable outcome of his decisions.

Special consideration must be given to the rationale for developing the programmed interviews for occupational exploration, college and scholarship planning, and special educational planning. Admittedly, the cost, size, and scope of the task required to develop and maintain adequate programmed counseling interviews is enormous. The major purpose of the Tiedeman-Harvard project is to develop a large-scale information system to implement such interview programs.[1] The intent in the SDC project is not to duplicate the work being done at Harvard, but to focus on a much more limited purpose--to explore some of the system problems associated with the use of programmed interviews in a secondary school setting. It is anticipated that the materials being developed at Harvard will not be ready in a form adaptable to the Los Angeles environment in time for the project; therefore, the limited interviews mentioned are being developed. Some of the system problems that will be explored with these interviews are:

- Can procedures be developed permitting counselors to develop and modify their own programmed interviews, using the PLANIT language?
- Can counselors pool their knowledge about occupations and education and make this information available to the student via the computer? How can a limited number of terminals for automated interviews be scheduled effectively in large secondary schools?
- What should be the nature of the relationship between the counselor, the student, and the programmed interview?
- Can the computer be used to give students purely factual information, saving the counselor many hours of routine interviewing?
- How do students react to receiving information from the computer? What student characteristics--and program characteristics--seem to be associated with positive and negative reactions to interaction with the computer?

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[1] Tiedeman, D., et al. A Harvard-NEEDS-Newton Information System For Vocational Decisions, 1965.

B. INSTALLATION OF EQUIPMENT IN THE SCHOOLS

Current plans are to install one teletype at Monroe High School, and one at Sepulveda Junior High School. These teletypes will communicate with the Q-32 Time-Sharing system or the IBM 360/65 Time-Sharing computer at SDC. The number of terminals selected for installation will be based on practical economic considerations. The estimated characteristics and costs of computer facilities under development would make the costs for a large number of terminals prohibitive. The most likely configuration to be generally employed in the next five years will be the sharing of large centralized time-sharing computers by many schools, each school having a limited number of terminals. During the system development process (Section D, below), effort will be focused on exploring ways in which the limited number of terminals can be used more efficiently by counselors and students.

Initial preparation of student data for the system will require keypunching directly from the cumulative folders. In order to facilitate this operation, keypunch machines will be installed in the schools for the period of time required to punch the data.

C. TRAINING OF COUNSELORS

Counselors must be provided with training in three areas: the use of the computer system; the establishment of system development procedures; and group counseling techniques. Counselors will be trained to use both the language developed for the computer system and the PLANIT language. Training in system development will include setting up procedures for system evaluation, planning for system change, and documenting changes to the system.

Training in group counseling techniques has begun at the high school. Periodic training will be continued in this area to reinforce the counselors' involvement in developing strong counseling relationships with their students. The counselors should have opportunities to train from time to time with outstanding leaders in the counseling field.

D. SYSTEM DEVELOPMENT PROCEDURES

The system development process is one of constant testing, feedback, evaluation, and revision. The introduction of the computer into the counseling operation will greatly increase the fluidity and growth potential of the counseling operation. Counselors will be provided with increased access to and control of information, increased research capabilities, and the capability for allocating some of their present activities to the computer. The computer programs, the user languages, and the interviewing capability are being designed so that the counselors themselves can change and adapt these procedures to their own needs. Individual counselors will even be able to modify the user language to satisfy their own idiosyncratic desires when they interact with the computer. This inherent potential for growth means that the system will evolve and change as the counselors work with the system. However, the change process in a man-machine environment requires some systematization in procedures to assure communication and orderly growth. Counselors will be trained to initiate procedures for system change. The research staff will work with the counselors and will implement the computer programming and language changes resulting from the system development process. This process will be continued for a year to permit adequate improvement and development of the system.

E. POST-SYSTEM-CHANGE EVALUATION DATA COLLECTION

Data on counselor and student attitudes toward counseling will be collected after the system has been in operation for a year.

In addition, counselors will keep a log describing the way in which they spend their time; this log procedure will be similar to that currently being employed prior to the beginning of the system implementation and development process. (The current log is kept one day each week during the semester; the day to be recorded is rotated each week.)

Student dropout data will also be collected following the year of system development. These data will be compared to the data currently being collected. The Crites Vocational Development Inventory will be administered to a large sample of students following the system development process to determine whether any changes have occurred in these measures. Analysis of the data will focus on trying to define and describe the changes and direction of change in variables that appear to be related to the changes in the system.

F. DOCUMENTATION

The final report will be written to serve as a manual for use by others interested in developing man-machine counseling systems. We will attempt to produce this manual, together with the final report from Phase I, as a monograph.

APPENDIX A

ITEMS CONTAINED IN THE CARD SORT OF COUNSELING ACTIVITIES

1. Help student make decisions about occupational goals.

2. Help student explore his problems, feelings and possible courses of action in an individual interview with counselor.

3. Assist student in course planning and/or programming.

4. Identify usable skills, aptitudes and interests of individuals.

5. Advise persons as to predicted success in particular course and/or program.

6. Help prospective students determine their areas of strength and weakness, possibly recommending enrollment in remedial classes where necessary.

7. Give advice to students.

8. Help students solve problems of a disciplinary nature.

9. Help students explore their problems, feelings and courses of action in a group counseling setting.

10. Teach an orientation or problems course in which a major purpose is to achieve objectives of a counseling nature, i.e., exploration of one's abilities and interests through testing,discussion, selection of vocational choices, etc.

11. Discuss problem cases with other people on the counseling staff.

12. Refer student to outside agency when appropriate or more pertinent for solution of a particular problem.

13. Assist agencies and groups which deal with vocational problems of specific groups such as:

    State Employment Service
    Department of Labor
    Bureau of Indian Affairs
    Department of Welfare
    Probation Department
    Vocational Rehabilitation
    Foreign Students
    Job Corps
    MDTA, etc.

14. Perform registration, schedule changes, program requests, transcripts.

15. Administer tests.

16. Score tests.

17. Use electronic data processing equipment and techniques for processing student information.

18. Record test scores.

19. Record anecdotal notes.

20. Write reports such as: status reports, case reports, test summary reports, placement summary reports.

21. Establish descriptive or predictive relationships between test data and student performance.

22. Establish relationship between anecdotal data and student performance.

23. Establish cut-off scores for acceptance of students.

24. Consult with teachers about their students.

25. Consult with family of student.

26. Consult with administrators regarding such things as: occupational trends, curriculum planning, evaluation of the educational program, etc.

27. Report and/or discuss test results with students.

28. Report and/or discuss student test results with teachers.

29. Report and/or discuss student test results with administrators for the purposes of curriculum evaluation and planning.

30. Make contacts with industry and/or unions for purposes of obtaining occupational information, general employment trends and/or inviting people to speak at "Career Days."

31. Collect, store, maintain up-to-date occupational information.

32. Refer student to and/or discuss occupational information.

33. Make contacts with industry regarding placement.

34. Make contacts with industry regarding curriculum planning.

35. Send job applicants out to interview for a particular job opening.

36. Help students obtain scholarships.

37. Follow-up students in course work.

38. Follow-up dropouts.

39. Follow-up students after placement.

40. Conduct research of a nature to permit hypothesis testing or evaluation.

41. Conduct a job analysis for the purpose of identifying skills, aptitudes, and interests necessary for job performance.

42. Assist in curriculum development.

43. Perform speaking engagements.

44. Give talks related to articulation problems and procedures to outside groups of counselors or students.

45. Attend staff meetings for purposes of planning and consulting.

46. Participate in in-service training programs.

47. Help persons make necessary financial arrangements to stay in school.

48. Observe economic trends as interpreted from national, state, and local information which will reflect approaches to counseling and educational programs.

APPENDIX B

INTERVIEW FORMATS

Form 1. Responded to by Person Directly Responsible for Administration of Counseling Organization.

Form 2. Responded to by Each Individual Counselor.

Form 1

Name of Institution

Location
Urban (pop.)
Rural

Type

Organizational Chain

Gen. Descrip. of Faculty

No. Employees Day Nite Total

Av. Ed. Attainment
Vo. Cred.
B.A.
M.A.
Beyond

Av. Salary
Teachers
Supervisors

Personnel Turnover/Yr.

	Day		Nite			Hrs. Class Inst.	Av. Age
Area of Education	M	F	M	F	Total		
1. H.S. Basic Ed GED Voc. Acad.							
2. Gen. Ed.							
3. Acad for Trans							
4. Apprenticeship							
5. Special Ed.							
6. Agriculture							
7. Home Ec.							
8. Business							
9. Distributive							
10. Pract. Nurse							
11. Tech. Ed. Specify							
12. T & I - Specify							
13. A.A.							
14. MDTA							
15. Special							
16. Other							
TOTAL							

No. of stud. their counseling system/yr.

Counselor-Student Ratio

Counselor Assignment
1. Nonassignment
2. Alphabetically
3. Academic Major
4. Male, Female
5. Functionally
6. Other

Resp. for Sel. of Counselors

Equip. & Facilities Available for Counselor Activities

Hardware

Facilities

Student Characteristics

% who complete deg. or licensed prog.
1. 25%
2. 50%
3. 75%
4. 100%

Reason for Dropout (%)
1. Academic Failure
2. Financial
3. Change in Vo. Interest
4. Beh. Adjustment
5. Personal

Students in attendance who may attend
1. School District
2. H.S. Grad.
3. Non-H.S. Grad.
4. All Adults
5. Other

Special Students Referral School Status (Reg. (Spec. Prog.)
1. Re-hab.
2. Indian
3. Foreign
4. Cult. Dept.
5. Co-op Prog.
6. MDTA
7. Job Corps
8. Other

Testing

Purpose:

1. To admin. tests as basis for ed. counseling, qualifying certification & admissions.
2. To counsel indiv. re Vo. & Ed. choice.
3. To admin. GED Tests for H.S. equiv. cert.
4. To assist indiv. w/occ. placement and/or ID employee skills for local bus. & ind. occup.
5. To act in consulting capacity for bus. & ind. in sel., upgrading & rotation of employees.
6. Other

Testing Agency for:

1. GED Testing Service
2. Equivalency form for:
   Specify

Test Batteries Used

1. Mental Ability
2. Multifactor Apt. Tests
3. Separate Apt. Tests
4. Scholastic Achievement
5. Interest Inventories
6. Personality Tests
7. Special Batteries
8. Other

Total Tests Administered (All Types)

Day Prog.
Nite Prog.
TOTAL

Placement of Students

	Male	Female	Total
FT-Rel. to Train.			
FT-Non-rel.			
PT while in School			
OJT			
No. times placed			
% dropouts placed			

Job Follow-up (w/in 3 months)

	Grad.	Dropout	Dropin
Placement			
Teacher			
Friend or rel.			
Ad in newspaper			
Prev. Employer			
TOTAL			

What information available, who responsible for collecting

Flow procedures of each counseling function.

Data Processing

- Type of Info. Collected on Student
- Time per Assoc. w/Collection, Processing & Use of Info.
- Time Spent in Processing Data
- Procedure Used to:
  - Collect (Who)
  - Store (How Filed, What Form)
  - Process
  - Retrieve (Use)
  - Update
  - Modify
  - Deletes

Form 2

Counselor____________________________ School____________________________

Age____________________________ Sex____________________________

Education History

H.S. - Yr.
School
Major

B.S. - Yr.
School
Major
Minor

M.S. - Yr.
School
Major
Minor

Ph.D. - Yr.
or School
Ed.D. Major
Minor

Stat. Background

Pupil Personnel Credential Yes No
(Teaching Exp. Nec.?)

No. yrs. exp. as part-time counselor
full-time counselor

Professional organizations
(specify div.)
1. Am. Per. & Guid. Assoc.
2. APA
3. Other

Job History (Full Time Since High School)

1. Location
Yr. Length Salary
Reason for taking job
Function

2. Location
Yr. Length Salary
Reason for taking job
Function

3. Location
Yr. Length Salary
Reason for taking job
Function

4. Location
Yr. Length Salary
Reason for taking job
Function

5. Location
Yr. Length Salary
Reason for taking job
Function

6. Current Job
Length Salary
Reason for taking job
Title
Function
Comments on present job

Student Contacts

No. resp. for

Freq. contacts/student

Av.

Range

Counseling Orientation

Entry job

Career patterns

Char.:	I.Q.	Adj.	Socio-Econ. Status
1. Self-ref.			
2. Other ref.			

3. Procedures

Teacher Contacts

No. who request consulting

Freq. of contacts/teacher

Av.

Range

Counselor Interactions w/Sch. Subsystems

1. Psychologist
2. Psychiatrist
3. Social Worker
4. Health Service
5. Attendance Officer
6. Advisory Committees
7. Other

Flow procedures that differ from gen. desc. of flow.

Counselor desc. of bottlenecks, conflicts, lags in system.

Counselor ideas for use of data-proc. tech. in counseling.

APPENDIX C

CARD SORT REPORT FORMS

Form 1. Preliminary Sort Reporting Form

Form 2. Forced Sort Reporting Form

Form 1

PRELIMINARY SORT REPORTING FORM

Name________________________________

For the two smaller decks of cards, circle the number of each card under its appropriate heading.

MOST EFFORT				SOME EFFORT				NO EFFORT			
1	2	3	4	1	2	3	4	1	2	3	4
5	6	7	8	5	6	7	8	5	6	7	8
9	10	11	12	9	10	11	12	9	10	11	12
13	14	15	16	13	14	15	16	13	14	15	16
17	18	19	20	17	18	19	20	17	18	19	20
21	22	23	24	21	22	23	24	21	22	23	24
25	26	27	28	25	26	27	28	25	26	27	28
29	30	31	32	29	30	31	32	29	30	31	32
33	34	35	36	33	34	35	36	33	34	35	36
37	38	39	40	37	38	39	40	37	38	39	40
41	42	43	44	41	42	43	44	41	42	43	44
45	46	47	48	45	46	47	48	45	46	47	48

Form 2

CARD SORT REPORTING FORM

Name______________________________

Each card has an identification number in the upper right hand corner. List the number of each card in the proper group below.

			____			
			____			
			____			
		____	____	____		
		____	____	____		
		____	____	____		
	____	____	____	____	____	
	____	____	____	____	____	
	____	____	____	____	____	
____	____	____	____	____	____	____
____	____	____	____	____	____	____
____	____	____	____	____	____	____
3	6	9	12	9	6	3

MOST EFFORT LEAST EFFORT

APPENDIX D

EXCERPTS FROM STUDENT TERM PAPERS[1]

I. THE FUNCTION OF COUNSELING AND THE COUNSELOR'S ROLE

- Assuming that the need for enlightened counseling in schools is generally admitted and noncontroversial, it should follow that expansion in the school systems must require a corresponding expansion in counseling services if the school is to achieve its goal of happier, better-adjusted life for the individual. As of now, school counseling is in a position analogous to the premachine period in industry. (12)

- . . . The role of the school counselor is not well defined. There are literally no operational definitions or behavioral objectives specified describing the position of a counselor in a school. (10)

- The present function of the counselor appears not to understand the students' feelings, but to act as an unyielding authority, as the role of the computer would eventually be. (5)

- The counselor's main purpose, according to my beliefs, is to teach pupils to solve certain kinds of problems. These usually are related to educational and vocational planning and interpersonal conflicts that sometimes interfere with school learning. Due to our present system, counselors' time is increasingly usurped with the information processing part of counseling, and as a result [they] are not able to devote as much time listening to students in order to guide them into reaching solutions.

  . . . Good counseling is an adjustive process and should be an integral and a functioning part of any system concerned with the needs of the individuals under its care. In order to achieve this goal, and be successful, this process usually is concerned with the development of people. To reach this goal, the counselor should develop skills in understanding behavior, should possess sensitivity to each individual's needs, and must allow for freedom and personal growth. (2)

- The counselor in a school system does or should do three things: Counsel in the area of vocational-educational placement; counsel those who are having interpersonal conflicts which interfere with school or effective utilization of potentialities; detect and locate those students who are in need of remedial work in order to successfully complete their schooling. (8)

- As a graduate student one gets contradictory perceptions of the role of the school counselor. On the other hand, the university seems to define the psychotherapeutic function as the major concern, and on the other, the school districts themselves think of the counselor as an advisor, a scheduler, a disciplinarian, a processor of data, an in-service trainer, and an administrative assistant. (10)

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[1] The comments in this appendix are taken from the term papers of 16 UCLA graduate students. As part of their work in a course on moral and ethical considerations in counseling, they evaluated the proposed man-machine counseling system.

. The term "counseling" is used with reservation since this writer prefers to view counseling as something more than an interaction between a man and a system. A life in which "being" is achieved only as a result of interaction to a system is not in an existentialist sense of the word "being" at all. Therefore, as an attempt to replace the function of a vocational counselor, the computer is at best a depressing substitute. However, for those who would deny that vocational guidance and career planning assistance has a place in the counseling sphere, there would be less difficulty in accepting the machine for this purpose. In short, if one perceives counseling as only a reaction between a person and a system, then the implementation of a machine which can imitate that system would seem to raise few objections.

If, however, counseling is viewed as more than a series of "system-interactions" (as does this writer), then it would seem that it's at this point where something additional is required that the boundaries of the computer are drawn. This something additional includes the human ability to: (a) perceive and react to what's occurring at the subconscious level of another person; (b) actually feel the feelings of another person in such a way as to give that person relief from knowing that someone else is sharing the feelings; and (c) behave with a unique flexibility that captures the total phenomenology of the situation. (4)

. One of the goals of personal and emotional counseling is self-awareness, which is helped by experience and interaction with other humans; e.g., my present counselee commented when she left her first interview, "At last, I have someone to talk to."

The counselor relates with his counselee's reality (how he construes the world), not his own, and the question of values--good or bad--is kept out of the counseling process as far as possible. One of the counselor's goals is to change the counselee's behavior so he will feel better about the world, himself and others, which I think can be accomplished by teaching him how to solve problems: e.g., (1) focus on goals; (2) focus on obstacles to goals; (3) generate alternatives; (4) perceive consequences of each alternative; (5) commitment to a plan of action. My counselor is committed to increasing man's understanding of himself and others. (6)

. I feel that there is poor communication between counselors and teachers and administration because many times they are trying to accomplish different things. Also, many times they try to accomplish the same thing but they go about it in a different manner. I wonder how many teachers are really open to the suggestions of the counselors. A teacher might be more open to suggestions made by a machine. (9)

II. ROUTINE CLERICAL WORK IN COUNSELING

- It is a known fact that counselors are so busy with clerical work that mainly involves processing and transmitting information, that little time, if any, is left to counsel students. If a computer were designed to handle the clerical part of the job, the counselors will be free to devote more time to their students. (3)

- It seems unethical for a counselor to waste his time doing clerical work. If the counselor did not have to do clerical work I think it would tend to humanize the counselor. If computers can free the counselor to be more understanding, more capable of caring, [to have] time to improve procedures, time to have feeling, time to plan courses of action and follow-up, and more time to spend with the student, it would not be ethical for one to reject the computer. One of the main objectives in using the computer should be to relieve the public school counselor from his clerical duties so he can have more time to do personal counseling. (9)

- I visualize the computer [as] being a great help in doing much of the clerical chores now relegated to the counselor--reports, preliminary scheduling, etc. Also if the vocational, educational information were available to the counselor at fingertip, this would ease him greatly. This [time saved] the human counselor should use for individual counseling. (8)

- Even when human counselors are doing the counseling, the computers could remind them that it is time to do a certain thing like contact a student or parent. To maximize efficiency the computer *could also help administrators* to make decisions concerning students, teachers, and other matters. The use of a computer would be an easy way to sample student trends, needs, etc. I cannot see why it would be unethical to let the machine take over all of the information processing, for I do not view this as counseling bur rather clerical work. (9)

- It seems that counselors are often unable to really function as counselors because of the information-processing required of them, such as transmitting, reporting, recording, acquiring, and searching for information. (1)

III. GENERAL EFFECTS OF THE COMPUTER ON THE COUNSELING FUNCTION

- Will SDC's man-machine concept of counseling help us to move closer to a more effective and efficient type of counseling that will enable us to move closer to a type of therapy as stated by Porter? I say yes, because the computer's main contribution, as SDC looks at it, will be the giving of counselors more time for interaction with individual students or groups of them. How can one question the vast range, versatility, and efficiency of the computer in the data processing field? This poses no ethical conflict for me, seeing as it would serve as the most efficient and effective information processing system possible. (7)

. Needless to say, I am not too pleased with the proposed computer counseling system. At present it appears much too rigid and nonpersonal, especially since the present system has many deficiencies.

According to the model, the counselor would be relieved of all clerical skills. All scheduling, grades, health reports and general questions could be fed and answered by the computer. However, the model does not at all imply the counselor could or would spend more time with the student. Instead, he appears to be freed of some of the remedial skills in order to stay out of the reach of the students more. For example, follow-up programs for the seniors, job interviewing for the seniors, accumulating information regarding jobs from outside sources, etc. To me this does not alleviate the communication gap between the student and the counselor. It is my opinion, that this only widens it. Thus, it is felt it would almost be impossible for the counselor and the student to be at the same level of communication, because the interest of the counselor is for the student, but not with the student. (5)

. I would say that it has great potential for unburdening taxed counselors, giving students at least a limited counseling experience and perhaps bringing unnoticed conflicted students to a counselor's attention. Yet it also creates, to my mind, a great deal of problems--problems of privacy, or privileged information, of imposing one's value system on another. (1)

. . . . A machine must be programmed to do specific things. One cannot tell a computer to "do good things" or "make wise decisions." I have seen no explicit statements that say what it is the automated counseling system will be programmed to do. There have been many hypothetical assertions concerning some concrete output, but no statement of basic values from which the supposed output springs. As I see it, the system will store and retrieve information--nothing more. The meaningless hypothetical dialogue between a student and a computer which has been written must have a theoretical basis, but no such theory is stated or referenced. (10)

. Discounting such personal objections as the one based on fear of displacement, the main questions [for a system of computerized counseling,] seem to be:

1. Can the computer be made to pick up and take account of the nonverbal cues that are so meaningful even in the mechanical areas of information giving?

2. Can the individual's right to privacy and individuality be respected in such a system?

3. Can computerized counseling be made to serve the goals of self-direction and growth in the individual?

4. In order to guarantee this (3 above), will the final responsibility for the program structure be that of the trained counselor rather than that of the technician?

Unless these questions are answered satisfactorily from the counselor's philosophical and professional viewpoint, there can be no real basis for a man-machine partnership. For inevitably, man and machine would work at cross purposes, and the one to suffer would be the one both had hoped to help. (12)

. The counseling approach that has been developed by SDC at Monroe High School is task-centered rather than person-centered. It occurs to me that the machine would, as a result, be interested in the process of counseling rather than the result. I have always thought that the person was more important than his problem. I do not feel that we should try to fit the individual into a mold but rather we should encourage his development as an individual. I wonder if machines were used in counseling if it would make the pupil feel more alienated from any kind of personal relationship. (9)

. Oft-times during an involved interview, it is necessary as a counselor or listener to do two things--both listen and observe. In more sophisticated terms, this is known as observation of verbal and nonverbal behavior. It is felt by this author, that generally, the nonverbal gets close to the feelings or are the actual feelings of the person. When these feelings are observed and not expressed by an individual, it is possible as a counselor to question, confront, or ignore these expressions to the extent that generally you can get to the real issues with the person.

To my knowledge, no computer is capable of handling any of the above. The computer merely responds to specific cues given by the individual. The difficulty occurs when the answers and the "feelings" are anticipated not for just one person, but for many. (5)

. Since computers can provide the speed and efficiency in helping students, it becomes necessary to evaluate the role of the counselors to function in a more meaningful way. We can assume that most of the well-adjusted students in school will have little need for help from the counselors themselves since the machine will provide college guidance services for these students. It follows then, that most of the problems will be centered around students who need the help in vocational as well as in adjustment classes. Counselors must be able to work more closely with deprived individuals and groups in the coming decade. The counselors must be able to see their problems realistically in light of what is happening in the outside world. The role of the counselor then must focus on genuine problems, [and counselors must] demonstrate sincere interest in coping with the problems they face in their own communities. (14)

. The SDC concept of man-machine counseling has been incorporated to my mind as being ethical, up to the point at which it has progressed. Information processing and transmitting present no issue to me. The ethical question then, stems from the fact that the computer will be used in an area that helps students with course programming, post high school educational planning, and vocational exploration. I have resolved this by comparing the method in which the computer works against the way an individual solves his own problems. They are similar in many aspects, and if the computer can do a better job, why not let it? My only caution is that we must be wary of human error, the entering of emotions, faulty assumptions, and the lack of adequate information on the part of the student into the man-machine concept of counseling. Being logical at all times is by no means a characteristic human trait. (7)

. Information giving and advising students seem to be the greatest area of promise as I see it. Student registration, requirements for graduation, report cards, program reports, unsatisfactory reports, cumulative folders, and identification of special students are jobs that counselors should not be doing. This clerical work could and should certainly be done by computers. I feel that academic advising could be done just as well by a computer because there are certain limitations as to the range of the interview. Academic advising could include discussions of high school majors, vocational plans, and post high school plans. Obtaining, retaining, and dissemination of information concerning colleges, industry service organizations, loans, and scholarships could be handled by computers. Certainly any time a search of the records has to be undertaken, the machine could do a much better job and should, therefore, be used. It has been demonstrated that the computer can discuss aptitude, achievement, interest, and academic aspirations with students. If the student prefers such a task-oriented interaction, then, in my opinion, it would be ethically right to use the machine. The problem is already delineated. Computers could score tests and make placements on the basis of these tests. Computers would be less biased about all occupations since, to a computer, one job should be as good as another. Computers could handle effectively the entire preregistration process. (9)

. The computer performing mechanical and electronic operations is a powerful research and data-processing tool. It does not solve the world's counseling problems, but is a means, not an end in itself. As a tool, by itself, it can accomplish nothing, but in the hands of an imaginative, ethical scientist, its potentials are almost limitless. Output or results can be no better or worse than human conceptualizations, as it is no substitute for good and long cerebration by its human user. In any automated system there must be human contact. (6)

. [My] resistance stems from emotional arguments that have to do with human isolation, human privacy, human freedom, human ethics, and economic security. In addition to emotional problems, there are other problems to overcome. These deal with administrative, technical and economical aspects. Some of these might be defined as the high costs of owning the machines; the high costs of sharing time on the machine; the complexities of installation of hardware, and the even more complex job of teaching counselors and counselees to use it efficiently. (13)

- In dealing with the next point, we are thinking more of present computer realities than of future possibilities. The whole concept of counseling is built around the counselor's capacity to understand and respond to not only the content, but also the feeling behind the counselee's verbalizations of his problem. The machine cannot do this. All it recognizes and deals with is a response that has face validity. And if a counselee says yes, but with a clouded face, the machine cannot but give it the same weight and value as a yes said with a smile. This is a great weakness of the machine, and lays its adequacy open to doubt even in the mechanical areas of information and planning. (12)

- But I would not want the machine to counsel me on any interpersonal problems. At this point I need contact with another person--a person who understands what it is to be human. I would consider it ethically wrong for anyone to use or allow the machine to be used in a situation where the individual involved would identify his reason for counsel as a "deep personal problem." Since the interpretation of a "deep personal problem" is largely a relative matter, strict control would be quite difficult. This puts the ethical responsibility on the shoulders of the individuals who make the machines available, and the individuals who seek the use of the machine.

  However, some ethical controls probably could be exercised in broader areas. For example, "machines shall not be used in dealing with homicidal or suicidal cases;" or "machines shall not be used in dealing with marital problems." These classifications of "deep human problems" and others could be established as problems with which a machine was not to tamper. (11)

- I feel that in personal counseling there should be people performing the task of counseling. Machines could be of great assistance by helping perform other tasks related to counseling in order to give the school counselor more time to do personal counseling. (9)

- If computers can be made with built-in guarantees for human individuality and freedom; if their operation can demand, and have, the total involvement of the counselee in the solution of his own problem so that he grows thereby, then its partnership with man in counseling should be cultivated. Until then, the negotiations for partnership must be approached with caution.

One thing is clear, however: In this age when mechanization and technology are coming to the aid of man in practically every phase of life, it seems inconceivable and contradictory that the school, or any of its services, should keep themselves out of a trend which they, more than anyone else, have been instrumental in developing and fostering. The question is not whether or not machines should be used in counseling. Machines are here to stay, and it is futile to try to bar them from any areas of human activity. The relevant questions concern the extent to which machines should be used, and whether such use will elevate or degrade the human Self.

Perhaps the most profound of the objections to computerized counseling is in the realms of the philosophical or ethical, that is to say, in the perceived goodness or badness, rightness or wrongness of the whole idea of a man-machine interaction. Not all such objections can be pinned down to something readily definable. Some are; but others are more vaguely rooted in some internalized system of values which are not too easy to define or verbalize. (12)

IV. REACTION TO THE DESIGN IDEAS PROPOSED BY SDC AND THE SCHOOL COUNSELING STAFFS

A. STUDENT DATA STORAGE AND RETRIEVAL SYSTEM

- In discussing the information retrieval system, my general reaction is practically and ethically positive. The system, as presented in class, appeared very workable and useful in the common school situation. From an ethical standpoint, many seem to fear that this will serve to depersonalize our schools even further, and I must confess that at first, this was my strong reaction. However, as the system was presented in class, my ethic did not change, but my view of the system changed. Instead of being a threat to depersonalization, I began to see that this system, in reality, would actually increase contact between counselors and students. A machine that frees people to make the function of humans more human is good. (11)

- Using the computer as an information retrieval for the manual handling of student data such as cum [cumulative] records, health records, program card, etc., seems to be an excellent program for the transmission and use of student records by authorized school personnel. If the material is programmed into the computer and accessible to only qualified people, it would offer a surer method of controlling confidentiality than perhaps the present method we are now utilizing. I see no particular ethical threat in using the computer in this manner now, because the confidential data is kept in schools now in a less secure position, where far more people have access to it. Not only will this save time for the counselors and other personnel, but it does not violate any principles of conduct in relationship to right and wrong conduct. (2)

- The computer should be used as a recorder and retriever of information on students because this benefits counselors. As I see it, the problems involved--because of my value of human dignity and uniqueness--is the fear of becoming merely a number in the system. When handling of information about people becomes routine and automatic, a person's right of privacy might not be protected. (6)

- As an aid to collecting and maintaining data for student records, the computer appears to be an excellent innovation for the counselor. To be able to identify students instantly makes possible additional time for counselor interaction with each person which might have otherwise been "wasted" in such a clerical chore if done manually. Similarly, there are great advantages in being able to share student data rapidly and accurately among the *professional* student services in the school. One such advantage would logically be the diminished student feeling of "being list in a bureaucracy" when such results from an ineffective communication system among offices. (4)

- How will the information the computer has stored in it be used? Who can use it, and for what purposes? (This has been gone over by others so thoroughly that I would rather not discuss it further, except to point out the danger of a system which has so much information on each student that it knows him better than he, himself. Such a system could easily lead to a state of paranoia where everyone is fearful of the computer, fearful of anyone finding out about his real fears, joys, etc.) (1)

Comments on Privacy

- A client needs to be assured that he is safe with his counselor, that he can confide in him unconditionally without fear that the confidence could be misplaced. Every counselor knows that it is unethical to act otherwise. With the machine system, the position is not so clear. In the first instance, all data relative to the individual is stored in the computer's memory and can be retrieved at any time. The interaction itself is never oral; everything goes on record automatically. How much privacy can a counselee expect from a situation like this? And who may have access to all that mass of private information? The fear that one might be giving himself away to the computer without his privacy being protected could create a distrust for computer counseling. It is easy for the private information stored in the computer's memory to become common knowledge, and common property. (12)

- This matter of privacy of personal information from my viewpoint is a crucial issue. If no adequate answer to control can be found, I would not support the system. Personal privacy is more important to me than having information at my fingertip. (11)

- I am now concerned with a storage place for computerized data or a central federal storage place. I feel that the ethical basis of this revolves around need. I feel that certain institutions need certain data on certain people. A person should know what information is being kept in any file on him. Only basic needed information should be kept, and only people who need the information should be able to get to the files. I feel that it is unethical for an institution to keep information concerning someone that the person it concerns doesn't know they have. I feel that it is unethical for them to release this information. Of course, the question always arises of who will have the authority to release the information.

One of the dangers in keeping records is the fact that someone in the future can read them. Someone who has no right to. I feel that the computer is probably more capable of assuring privacy than is the human. (9)

- The first consideration in an information retrieval system would be the question of personal privacy. Every individual has the right to keep certain items of personal information to himself if he so chooses. One fear I have in this system is that this easy means of obtaining information will make people "information happy." Using a computer could become much like a person passing a drinking fountain--though he is not really thirsty, he takes a drink because the water is right there. Without strict controls on the use of this system, the right to privacy of the individual could simply vanish. Many counselors already seem to be information-centered, that is, they seem to enjoy getting information just for the sake of getting information. The system needs to provide for control against this tendency by having strict rules for who may obtain the information and for what purpose. (11)

- As discussed above, computerized counseling systems can perform a data storage and retrieval function far better than the present "file cabinet" system which is most common. The hue and cry raised concerning the lack of privacy is an inappropriate reaction. Why would a magnetic tape be less private than even a locked file cabinet? On the contrary, the intruder would need some special equipment to have access to computerized information, but need only know how to read if he gained possession of a cumulative folder. (10)

- Who decides what information will be retained and what destroyed? For with these computers having such potential as information retrieval systems, do I want every facet of my life available to a counselor, every word left to posterity despite my age and immaturity? Who tears out the sheet of paper from the teletype if the student forgets? Wouldn't the cathode ray tube be better for some kinds of communications? How privileged is this communication? Will the pervasiveness of a middle class value system drastically limit the applicability of this system when subcultural mores don't embrace this same way of life? (8)

- I believe the information in the computer belongs to the student, with the rights of the school to use the information to aid him to become a useful citizen in our community. Because computer systems have the capacity to store much more information than there are [sic] in the cumulative records, it is imperative that only certain information be made available to the staff and teachers. The information from interviews should be handled by the counselors and not by the other members of the staff. The information should be available to the counselor since this kind of information is necessary to help the counselee in his everyday problems. I don't believe in an open door policy on private information. (14)

- In such a program there will definitely be a security problem. This bothers me the most. What will prohibit people from gaining access to their classmates' records? Here, I feel, we must build in as many safeguards as possible. Since all the information concerning a person is only a "punch of a button away" what security measures can be taken? Whether you have the operator check the person using the machine, have a code system, or use another method of retaining confidentiality, some precautions must be taken. (15)

. As for the questions of: What data should be collected, who shall use the data, and who shall determine what persons use the data, the machine is not guilty of introducing a new problem. The answers to these questions, it would seem, should be handled in the same manner as if the computer were not to be used since there are ways of building into a system limits on handling the data. (4)

B. PREDICTION AND RESEARCH SYSTEM

. I feel it is ethically wrong for a machine to do this. No program could presume to consider the multitude of human variables that would bear on a person's success or failure. It is not right to run people through a formula and make a judgment as to the probability of their failure in a particular endeavor. My concern is not so much for the prediction of success as it is for the prediction of failure. What does someone do when he is told that he will probably fail? He usually will become quite discouraged and depressed and it may serve to completely squelch any ambition he might have. Granted, it is good to be aware of obstacles to a goal, but rather than putting the statement in terms of "failure," would it not be better to predict in terms of "success" and "obstacles to success"? Our goal is to encourage people to overcome obstacles and to extend themselves to their maximum potential in the "pursuit of happiness." (11)

. The computer can usually do a better job of interpreting test data than can humans. I feel that it is unethical to not use the best methods available. (9)

. Ethically, making predictions about peoples' successes or failures whether these be made by a man-machine or a human being has always presented certain problems in regard to my value system and to professional relations among most people. The phenomenologist is concerned with the prediction and control of behavior. The use of this field can result in the prediction of general, normative behavior only. I feel that individual behavior cannot be predicted from normative behavior. Assuming that the counseling system would be set up with these general guidelines adjusting to the norm, I would hesitate to place a total amount of confidence into a prediction formula, for predictive purposes. (2)

. Making decisions regarding educational and vocational plans is to the writer one of the most delicate and serious tasks a person faces in his lifetime. Certainly predictive guidelines would tend to make this task more structured and consequently less painful. . . . If such predictive data were to become a means or object referred to as "that which determines the choices a person makes" then burn the **** machine! Life must be more than what is determined by synthesized data and a predictive formula. To the positivists the introduction of this predictive data would be a great milestone in the history of man. To this writer (an existentialist for the most part) it would appear to be a major "tombstone" in the development of being. (4)

Comments on Power and Control

. It seems to me to be true that positions of power and control are most frequently sought after by those individuals in whom such power would be most dangerous. Let me spell that out a little. Persons, who, in my view, are very mature, loving, respectful of the dignity and uniqueness of others, and concerned for their freedom, do not typically seek out positions where they can exert their authority, or pressure others to go along with their way of thinking. Rather, it is more often the anxious, authoritarian person who seeks positions of authority. If this is indeed the case (and I am not certain that it is), then [selection of] the person who is to control the implementation and design of the man-machine system, would be an important decision. Should it be the individual counselors, a school administrator, a governmentally appointed person, or whom? That's another reason for justification of a person-directed program. (1)

. It seems that much of the controversy on ethics and computerized counseling is based on "who" will be the person to make the decisions. For example, who is going to tell a student that he doesn't have the ability or prerequisites or whatever to take a course he wishes. (9)

. Power is inherent in any system which can store, manipulate, disseminate information. Information is power. And those who have the control over the system should indeed be moral men.

The issues being raised now with the use and control of computers are extremely crucial ones. Are we to wait until some one is feeling violation and contests it via our law courts before we take issue with it ourselves? (8)

. It seems that on a direct confrontation with a person, you at least have a chance to argue and shift ground as the necessity occurs. However, it appears with the computer system, the agenda is already given, and furthermore the counselor can have his mind made up before the student enters the counselor's office. This, according to the model, is "recall" of data of information that the computer and the counselor did not have readily available. It appears that under this system, the student will always be one step behind his counselor. All questions by the student are almost predetermined and filed by the computer for the counselor. Thus, direct confrontation is almost nonexistent by the student because the counselor knows the area in which he may be confronted. In other words, alternatives are preselected by the counselor before the student gets to the issues. This to me, is a further breakdown in communication because of the lack of sharing ideas and thoughts together. (5)

C. AUTOMATIC PREPARATION OF PERFORMANCE REPORTS

. The idea appears to be a clerical timesaver. If such time saved is used to interact in a personal way toward problems and achievements revealed in these reports then by all means the idea appears good. If, however, the report-making becomes a matter of assembly line output from the raw data to the parents, employers, college admission counselors, etc., without the inspection and personal reaction of the counselor responsible, then the results would seem devastating. Errors in the information would go unnoticed. Interpretation of the data would be left to the less skilled and knowledgeable about the intended meaning of the reports. In short, a mechanical noose would be tied to the student's neck. (4)

D. PREPARATION OF MASTER PROGRAM

. Utilization of the system for programming and scheduling appears to be the most outstanding and functional operation the counseling system has demonstrated. Since programming and scheduling require skill and experience in the ability to substitute in some cases, having the system function in this capacity would leave the computer more so in the area of computing rather than counseling in the humanistic area. (2)

. This seems to be one area where student choices are actually expanded as a result of data being synthesized by a computer. To ignore this as a computer task would likely mean limiting the choices a student and/or a teacher might realize if the job were to be left to the mechanical thoughts of clerical workers and administrators. It seems only honest to admit that a computer can put together alternatives of a complex mechanical nature more rapidly and with greater precision than man has been able to demonstrate thus far in history. Therefore, it would appear to be a waste of time not to take advantage of this mechanical opportunity if the end result is greater freedom and more choices available to everyone concerned. (4)

E. PROCEDURES FOR SCHEDULING STUDENTS AUTOMATICALLY ACCORDING TO PRIORITIES

. I see this problem as being solved by the computer taking over all of the clerical work plaguing the counselor at present. (6)

. This idea only appears to be concerned with rearranging the problem, not solving it. It is very limited as a possible solution; in fact, it does not offer much at all. (4)

F. PROGRAMMED INTERVIEWS

. The ethical question entangled in computer programming cannot be overemphasized. A computer connotes exactness. A student will most likely view the computer as a scientific mastermind, much less likely to err than a human. Most likely the student will take the computer's word as gospel. A "no" from the computer will be thought of as the final word. So ethical care must be maintained.

One thing my ethics insists the computer program should never do, for instance, is make decisions for the counselee. It should never offer alternative plans of action. It should never comment on the goodness or badness of what the counselee says. It should never attempt to instruct the counselee as to why he is thinking or saying what he is.

Then what should the program say? In SDC's educational and vocational guidance system, as I see it, the program should present information and concepts which might have meaning for the counselee--his academic record in relation to college requirements, for example--and ask the counselee if the information does, in fact, carry any meaning for him. (16)

. The task of communicating information to a significant "other" is accomplished through the "dialogue" or a special case of programmed instruction. The program could assure that at least intellectual understanding has been achieved by the significant "other." This function could guarantee the counselor that selective perception has not taken place. The person receiving the communication may misinterpret the data, but the facts would have been communicated. (10)

. Another concern is that a teletype is not capable of spotting problems as a counselor would be in an interview situation. Often the only contact a counselor may have with a student in a year will be for the purpose of obtaining or giving out some information. Frequently, through the process of this contact the counselor will observe some problem in the student. The problem is observed because the student came into contact with the counselor. For example, an acute stutterer could come into the teletype, obtain his information, and leave. He could leave without ever mentioning his problem and never realize that he could be helped. This type of problem must be considered. There needs to be some guarantee that the machine will not be the only counseling contact a student has in a school year. A machine interview should be supplemented by a personal interview especially if this is the only counseling contact in a year. (11)

. I can see that the machine has great possibilities of providing information and answering specific questions concerning school in general and curriculum. I feel that it is ethical for a machine to conduct orientation periods for new students, give out registration packets, and to conduct summer counseling as long as there is also personal contact with counselors, teachers, and administration. (9)

. In a counseling set-up that is as data oriented as SDC's, the idea that the computer might be programmed to type out predictive statements to the student on the basis of stored information it has about the student's chances of success in this or that area or college or vocational field worries me. Coming from a supposedly infallible machine could not this type of statement take on an aura of prophecy? Because it has been said it must be true? A self-fulfilling statement? Granted that individual counselors also do this, but the weighting, tone, facial expressions can modify or disclaim, encourage and motivate rather than discourage, whereas a printout statement from a hallowed machine carries little of this. It could affect future decision making on the individual's part in a rather drastic way. (8)

- That such a program as stated in Design Idea #6 could be used by students ". . . without the assistance of their counselor" raises violent objections from this writer. Course programming, postsecondary educational planning and vocational planning are tasks that require the most sensitive and skilled counseling assistance. Granted, it would seem beneficial to have as an "exploratory aid" a programmed sequence of questions and reactions which would undoubtedly raise questions and present alternatives in the mind of the student. However, this can, in no way, be interpreted as a substitute for counseling. Those persons who would separate such tasks as course programming, postsecondary educational programming and vocational planning from the responsibility of counseling are not only shirking responsibility but also one step from permitting a world of humans to become a world of "robot reactors" (i.e., persons who become the servants of a mechanized analysis and consequently have no feelings and emotions). (4)

- For myself, I would want the assurance that this system would not take away the only personal contact a child would have with a counselor in a school year. Ideally, every machine interview should be followed by a personal interview. It would seem that this would become quite possible since the machine was in the business of increasing the counselor's contact with the students. It is the duty of the planners of the computer counselor to guarantee that this objective is actually carried out. (11)

- Automated interviews would disregard one of the most important relationships that can exist in a counseling situation, i.e., the counselor's task is not to provide the student with solutions to problems, but to guide the counselee into reaching his own solutions to problems. The counselor's role at this point, according to my beliefs about counseling should be to help the counselee or student in identifying his goals. After the counselee's goals have been identified, the obstacles that possibly interfere with these goals should be made clear. Having the counselee generate alternatives and selecting alternatives for testing courses of action would follow. It is assumed that through proper counseling in an interview with counselees that they will learn problem solving skills, that they will not only apply to educational and vocational objectives, but also to problems outside the interview and school setting. We must not fail to recall that education is for the total development of people in all areas of development. (2)

- In a sample interview of an SDC program, for instance, the computer helped a student select a college. When the student had chosen a college the computer reacted, "On the basis of your projected grades, your present college choice indicates that you are thinking pretty realistically about your future plans." As I see it, this is an interpretation that does not belong. One can think only of the opposite pole. Suppose indications to the computer had been that the student's choice was unrealistic. Would the computer say so? To do so would transgress my ethics of proper counseling. Only the counselee should draw conclusions and make decisions, not the computer. (16)

I emphasize the need of supplementing the machine interview with a personal interview because I foresee a great problem with a system of such practical significance. In a day of tightening budgets where saving a dollar is often more important than an individual, I can see a computer counselor replacing a human counselor. This possibility frightens me and brings me to the second major problem area, namely, what computerized counseling might become.

In this area the first question I must answer is, "Is man more than a complex machine?" In class some have wanted to assume that some day technology could develop a machine that could function and react to people as a man. And after assuming this, the only question they want to discuss is, "What ought the machine be allowed to do? This latter question is a valid and necessary consideration, but I am not willing to concede that technology will develop a literal man-machine or "robot." (11)

The machine might be even more patient with some students than a counselor could be. With a programmed sequence of counselor responses, it would be relatively easy to look objectively at what is going on--what are the assumptions of the program and how well does it work--which cannot be done with human counselors. And if standardization of method is important, this computer program would certainly supply it. (1)

Comments on Alienation and Depersonalization

The proposal for computerized counseling threatens human individuality in at least two significant ways. First, the use of a fixed interview sequence in the program is a stereotype which covertly denies human differences in viewpoint and feeling. A program is set up in a certain way, and hundreds of persons are expected to react to it. For one person after another, the sequence is the same, the language is the same. There is no provision in the machine language to take cognizance of the variety in the counselees' levels of thinking or reaction types owing to their separate individuality. With a human counselor the position is different. Even if he asks the same question, his tone, expression, gesture and mood must vary sometimes without his knowing it, in deference to the individuality of each client he faces. (12)

There has been much written recently on the contemporary problem of man's alienation from himself and others. A computerized counseling system, by itself, would be another further step in alienating persons. The man-machine system (indeed, education as it often exists today) is a powerful influence towards making persons into objects, treating them as interchangeable units, towards increasing alienation from ourselves and one another. How are we to guarantee that a man-machine system would include a human element, a human counselor? I feel that too often an immature counselor would use the computer to allay his own fears of inadequacy. I also think of the one-way intimacy which the computer system generates. This would certainly be a comfort to those counselors who are afraid of real confrontation with another person, and might thus serve as a way for them to avoid genuine encounter with others. Thus, a counselor of this sort would feel safer--he would risk nothing, and he could avoid responsibility for those using the system by saying, "Don't look at me. I didn't design or program it!" I can appreciate the fact that SDC has concurrently suggested a plan for further development of counselors using their system, so as to help become more humanistic (which I value as "good"). (1)

o It was made clear that the goal of the machine was to allow man to best utilize their time for dealing with the real problems of mankind. There is no question in my mind that unless specific controls and rules are spelled out in the initial stages of the program, we are not going to see increased personal contact with individuals. Our culture is more machine-economy oriented than it is person oriented. As I look into the future I can see educators and psychologists using the simplest method they can: turning needy people over to a machine. This possibility really bothers me, because most people are this way. As I analyze the turmoil and unrest in our American culture, the problem of the loss of personal identity stands in the center of my mind. People need people. People need people who care. A computer must help to increase human contact, not decrease the little contact we presently have. (11)

o I think that the way the student reacts to the computer should be taken into consideration. I feel that the student should have the choice of whether he wants to be counseled by the computer or by the human. (3)

o In comparing systems, the argument is, if one considers the machine as a behaviorist, and the machine is fed information from another behaviorist, the student may not have an adequate opportunity to fully express his feelings, because of the expediency of this system. The present feelings of counselors, at most school systems, is to get them [the students] in and move them out. Thus, it appears a student is almost handled as if he were an object. The counselor recognizes the student may have a problem, and proceeds to suggest alternative solutions for the student. It is my feeling, that little or no opportunity is really given to the student to express his true feelings, for the sake of expediency. (5)

E. TRACKING AND MONITORING SYSTEM TO FOLLOW A STUDENT'S PROGRESS THROUGH SCHOOL IN TIME

o I think that the computer could greatly aid the counselor in detecting students who need remedial help . . . or who, because of some other factor, need counseling because their grades are dropping in one subject but not in others . . . [or because of] inattendance indicative of some problem. (8)

o Enabling the counseling system to monitor and recall educational and certain information seems to be an effective way of using the system, assuming that this information would be confidential and useful for authorized personnel. (6)

- If it is the responsibility of the counselors and there is human concern shown for these problems, then by all means, such a system would seem beneficial. For instance, if a potential dropout can be more easily and accurately identified then the time saved would be worthwhile if it is spent in counselor interaction with that student. (4)

H. REMINDER SYSTEM TO ALLOW COUNSELOR PREROGATIVE TO REQUEST MACHINE TO REMEMBER CERTAIN INFORMATION AND PROMPTS

- As an aid this item seems better than tying a string around the counselor's finger. (4)

I. FOLLOW-UP DATA SYSTEM

- I would gladly turn over these problems to the computer . . . this is clerical in nature and would free the counselor for more humanistic endeavors. (6)

- A follow-up data system would, no doubt, be beneficial to counselors wishing to make longitudinal studies. Such information would be useful to counselors and administrators in assessing the strengths and weaknesses of their entire program—counseling, curriculum, vocational, educational preparation, etc. (4)

J. REALLOCATION OF COUNSELOR'S TIME WITH ADDITION OF COMPUTER ASSISTANCE

- I would assume that the respective counselors best know their school situations and their students' needs and can best decide how their time should be reallocated. Who is to say that SDC's answers will be the correct ones? My personal bias concerning time reallocation, for instance, I find sadly lacking in SDC's list of possibilities. As I see their list, SDC has suggested that counselors should reallocate their added time largely in terms of other aspects of educational and vocational guidance. As I have hinted previously, I would prefer a renewed emphasis on personal counseling dealing with problems of interpersonal relationships as I assume this to be the most meaningful aspect of the counseling function. I believe also that educational and vocational counseling problems will be contained within this wider realm of personal counseling. (16)

- I can see many places where the counselors will spend their newly gained time, but I have failed to see where more time is to be spent with students. If we are freeing ourselves to better perform our duties, more time should be spent with the students. I feel that this is the main function of the counselor. This may have been their [Design team] intent, but it needs to be stated more clearly. (13)

- All of the tasks listed in item #10 would seem beneficial. However, there is no mention made of additional time to be spent with students in either one-to-one or group interaction. It is the writer's opinion that the primary benefit of computer assistance is the resultant time saved which may be spent with either an increased number of students or the same number interacting more frequently.

Upon reviewing items in Idea #10 it would seem more likely that some of these duties could be handled better by a computer than items in Idea #6. For example: "training teachers to interpret student data" would appear to lend itself quite well to such programmed learning. In addition, it would seem that information from local industries could be made available at least in part through the aid of such a device. In general, the reallocation of time suggested in Idea #10 seems to be focused on counselors spending more time and energy on adult relationships. Even the suggestion to "have counselors available before school, during lunch and after school" is not labeled with an intent to encourage interaction with students. In short, the reallocation of time appears to be extended in the wrong direction. (4)

- Relieving the counselor to work more with counselees, teachers and other school personnel seems to be an answer to the current problem that exists in most schools. If the man-machine counseling system could function in certain areas in addition to design ideas related to the reallocation of the counselor's time, it would provide more time for the whole school staff along with the counselors. (2)

- It has been said, that because we have the computer system, ample time will be available for counselors to take on additional jobs such as teaching a guidance class. I feel that taking on too many additional responsibilities can only dilute the effectiveness of the counseling program itself. I disagree that counselors have enough time to conduct a guidance class with the amount of student load they are now handling. Perhaps, when counselors have sufficient help in the future, then, such a program can be put into effect. (14)

- I do not feel that counselors should be in charge of planning the curriculum of the school, nor to be a public relations man with the community. I feel that a counselor's job should be counseling and if he does a good job this will keep him busy. I feel that it is unethical for schools to ask a counselor to do a clerk's or anyone elses job. (9)

V. PROBLEMS INVOLVED IN WRITING COMPUTER PROGRAMS FOR COUNSELING

- The first problem that we face is in the designing of the program. You can't afford to use the wrong approach or you will hurt the very individuals which you seek to aid. Perhaps we should go back even further and decide who will design the program. As I walked around SDC and heard of the work that they are doing, I was relieved to hear that trained counselors were being consulted in all stages of the experiment. I feel quite strongly that as many precautions as needed are taken to insure that this remains the case. Care should be taken that "technicians" do only what they are hired to do--program what the counselors want them to program. They should have no say in the designing of the programs we wish to implement except to say if they can program it or not. They are not trained to deal with humans in a counseling situation and in most cases they see only the most practical or efficient way of dealing with a matter. (15)

- Watching a demonstration of the system just described, two issues readily come to mind. First, there is an obvious shift of "power" from the counselor to (not the machine, but) the programmer. He is the one who arranges the collection, storage, retrieval analysis and application of the data. He is the one who foresees the possible course the interviews could take and plans for branching. Clearly, therefore, the quality of the interview is dependent to a large extent upon the knowledgeability, flexibility and skill of the programmer. Will it then become necessary for the computer programmer to have some formal training in counseling theory and practice in order to develop these necessary qualities? Or will the position become one in which professionals watch while some of their most delicate functions pass into the unprofessional hands of computer technicians? From SDC, where at least at the exploratory stages, psychologists, school counselors and computer technicians sat at the same table, there might be little to fear in this regard. But with likely proliferation of computerized counseling in the future, what guarantee is there against the upstaging of the professional and a takeover by the technician in the handling of human problems? (12)

- I firmly believe that men tend to live by laws and due to training are reluctant to break them. Therefore, I would suggest an organization of system developers which would be governed by a constitution or bylaws that would provide a system of checks and balances to assure all companies and society, that each company would carry out its tasks along ethical and moral lines. All groups would be encouraged to join and make written commitments to ethical practices, such as the television industry has done. Fines or punishments could be meted out to those who would break their commitments or prove to be unethical. Impartial judges could be called upon to rule in these cases. A legislative body made up of members from the companies involved, would decide the legal, moral, and ethical principles necessary. An executive board could be voted into and out of office, and would use executive power to direct and influence directives of the legislative body. For flagrant abuse which might be considered criminal, there would be the regular legal channels for referral. (13)

- Another ethical question I have rests in the fact that the machine itself is actually a person with its own ethical system. Actually, the ethics of the machine are the ethics of the programmer. In an information retrieval system the ethics of a programmer are of minor importance; however, in a system dealing with problems and real life situations, the ethics of the programmer become quite important. And as more and more functions are given the computer, more and more ethics will be involved. Our contacts in class have been with people who are genuinely concerned about people, but how can we be confident that all programmers will be this way? (11)

- The computer does not have a value system. Consequently, it can only contribute to the values held by those that program it. How ethical is it to impose the programmers' values on schools in general? (10)

VI. CONCERNS FOR THE POSSIBILITY THAT THE COMPUTER WILL USURP THE COUNSELOR'S ROLE

- Why is it that we are able to accept computers and think that they are wonderful when we think of computers in relation to all the other fields? But the minute we speak of computers in relation to education we hesitate and are reluctant to discuss the issue. What about education and why has it lagged behind the other fields? (3)

- If educators find that the machine is not a mere man-machine, but is a machine-machine, produced to ultimately take man's place in the counselling field, then in my opinion, it will encounter resistance. (13)

- Another type of objection to automated counselling stems from the fact that some people perceive the proposal as a potential threat to the counselor's job. Already at present the computer is capable of taking over five-eighths of that job. Why the human counselor is still in the service is that theoretically the computer is at present incapable of the more humanistic type of interaction with the counselee. But how long will it be before the computer does this? (12)

- I think another ethical question should be answered here. . . . Should we allow a machine to take over a job that has been previously done by a human? I see this question as being analogous to the Industrial Revolution. I feel that if the betterment of mankind is at stake, it is certainly ethical to let a machine take over such a job. Used in a public school situation, I could see the cost of counselling going down since counselors would have more time to see more students. If counselors' time could be used more efficiently, I would certainly think use of the computer would be ethically justified. (3)

- Determination implies manipulation. Whether we are conscious of it or not, our lives are constantly manipulated. It may not be in the all-out blatant Skinnerian sense in which man's thinking and action are manipulated, programmed and controlled to serve the ends of a wire-pulling clique. But in a limited sense we are being manipulated. To recognize that human freedom is never total, but limited, is to be not deterministic, but truly existential. (12)

- It is my opinion, that if the machine designed by SDC can be shown to be effective, economical (temporally and monetarily), and nonthreatening as far as total replacement of personnel is concerned, then it will be ultimately successful in the educational world. If this machine is produced to work with man and help him, not replace him, then it will hold only promise and an unthreatening new method of counselling and problem solving. (13)

For Those Who Think the Computer Will Take
Over Man's Place on Earth

I think that I shall never see
A computer made like me.
A me that likes Martinis dry
And on the rocks, a little rye.
A me that looks at girls and such,
But mostly girls, and very much.

A me that wears an overcoat
And likes a risque anecdote.
A me that taps a foot and grins
Whenever Dixieland begins.
They make computers for a fee,
But only Mama can make a me.

Hilbert Schenck, Jr. (1960) (3)

VII. IMPLICATIONS FOR TRAINING AND CLARIFICATION OF INDIVIDUAL RESPONSIBILITY

In the trial of such a system the need for a sensitive individual who has the necessary knowledge and skillful tact to put the utilization of these machines into a humanistic perspective is imperative, to my perception.

There is a monetary problem inherent in this system. Like, sure everybody says o.k., it will save us from all those chores and now we can really get in there and counsel. But who pays for the time and skill needed to train counselors in group processes, in sensitivity training? Is it right to coerce those counselors to enter into such activities who do not want to? (8)

Another ethical problem I see is related to the counselors who will use the machine. There is a tendency for many counselors to be information centered, and counselors who would seek to use the machine would more than likely be those primarily interested in information. The ethical question is whether the machine would actually free these people to become more human, or would the machine make these people more like the machine, that is, information centered? For ethical reasons, counselors must be trained to use their new time properly. They need to be taught how to use information as a means to a people centered goal. They should be instructed as to how they could maximize their contact with people and be encouraged to spend their "saved time" in relating to individuals. Some good suggestions were made in the "Integrated Notes From First Design Effort-Monroe High School" and they need to be carried out. (11)

Assuming that all these problems concerning hardware could be solved, an even more complex problem would be to change the behavior of not only the counselors, but also of the administration and teachers. They, too, would have to be taught to think less in terms of an educational system which is personnel-centered, and more in terms of an integrated man-machine system, where the task-oriented approach would be stressed. (13)

- In the computer age, the counselors must get better training and exposure in group counseling, in sensitivity training, and get up-to-date information on the trends for vocational guidance. With the increased use of computers, factual information about occupation becomes necessary. The counselors must have up-to-date published occupational materials, and have enough information about the basic personality traits related to these jobs if he [sic] is going to be able to counsel students effectively. (14)

- The man-machine counseling system has many outstanding characteristics and advantages that can enhance and improve the performance and objectives of school counseling. It will be a debatable item as to what functions the system should or should not handle. The main ethical question concerning this system should not be whether to use it or not, but how we should utilize the system in terms of human behavior and machine technology, for advancement and progress. The counseling man-machine system has the potential to solve some of our counseling problems, if only the obstacles to seeing them clearly can be pointed out and improved upon. The restructuring of the scientific field is constantly taking place and man cannot see the reality of it all. Machines have been functioning in many operations and developments for several years and will continue to do so. Individuals ethically must evaluate in the final analysis, make their own choices and must assume the responsibility for his [sic] decisions. According to our own value system and frame of reference, we must decide upon the computer as being good or bad, advantageous or disadvantageous. As man progresses, humans will have to continually readjust to the stream of new technology and inventions that evolve as a result of research and experimentation. Further, man will have to make decisions to accept or reject these new ideas and innovations. Since man is an emergent figure, and his field and surroundings are constantly being reconstructed via experiences, man accepts changes that are brought about. Thus man's nature is not fixed. In contrast, some of our values are fixed and some of our values change. By having this flexible attitude, man can and will, in most cases, accept new counseling machines, computers, ideas, concepts, and other innovations that come to pass for the sake of progress. (2)

- I do anticipate the probability that some counselors, unaccustomed as they might be to personal counselling, may feel a need for new information and concepts concerning this aspect of the counselling function. For this reason I do endorse the idea of training sessions for counselors. I assume that oftentimes individuals need help from without to plug cognitive deficits.

Such training sessions, however, should be of a particular nature. As I see it, the training counselors--in this case computer designs by SDC--should be concerned with two things: (1) the presentation of the various types of personal counselling and the philosophy attendant to them; and (2) helping each individual counselor examine his own values and assumptions in terms of the personal counseling function so that each might better decide which counseling orientation would be most comfortable for him.

These training sessions should not, of course, be mandatory. They would be designed merely as helping agents. My assumption again is that some counselors will need such help; others will not. (16)

- I believe that in directing the "human enterprise," man must not only acquire information about himself and his world and develop the competencies for dealing with his problems, but he must also come to grips with the problem of value, of what is good for him and what is not--and ultimately with the problem of the meaning of his existence--of just what his role in the universe is. From this broad background of beliefs that we all internalize, we look at the ethical issues of our everyday lives--such as the entrance of a man-machine type of counseling. I have aligned myself with this school of thought which believes that man is only what he makes of himself, and have expanded it to "the man-machine type of counseling is only what we, the builders, make of it." And if I can incorporate computer technology (as the SDC system advocates) into better counseling, or as a step toward it, then I will suffer no ethical distress. (7)

VIII. UNDERLYING PHILOSOPHICAL ASSUMPTIONS

Some of the considerations that seem to pertain to systems in general are as follows:

- But what about all this? How will it affect me and my thinking now and in the future? I feel that it is necessary to include within our philosophy of life a belief as to the way we feel toward machines. It takes a flexible person to live in 1967 and perhaps an even more flexible person in 1970 but it also takes a person who knows what they want in life and better yet, a person who knows herself and her philosophy of life, which I believe remains stable but not stagnant. (3)

- We must also re-evaluate our cultural attitude about how man views work, life, and how people can become aware of these cultural attitudes to meet future challenges. For instance, the concept of work in the past has been that a person had one job and stayed with it throughout his entire life. In the coming decade, a person who is educated must be able to adjust to his job, perhaps two or three times in his life. If this is so, the counselor's role will be to keep abreast with changing times and see if our value system is consistent or not. Perhaps, we must change our point of view so we may be able to avoid a conflict in our value system. Therefore, I believe that education will be the only answer in bringing changes to the people in the coming generation. Counselors must play a major role in reaching as many students as possible if we are to accomplish this task. (14)

. My ethical system rejects the absoluteness of good or bad, sees man as not entirely free, but capable of integrity, responsibility and choice in the here and now. After all, we live in a world that is substantially determined by external realities. In such a world, total freedom is possible. But man retains the radical freedom of choice.

My view is that the more man is able to think for himself, initiate and monitor his own problem-solving behavior within himself, without external direction, the nearer he is to perfection. The more he relies on external help, the farther away from it. (12)

. People exist. They live (mostly) in the context of other persons. Our very lives depend on the succor and nourishment we receive and give. Communication and tolerance for other belief systems not in accord with one's own is a goal from my framework worthy of striving for. Anything, any system which can smooth the way for any of us in our search for each other, in our search for ourselves, is a help providing it doesn't interfere with or prohibit another person's travel. The computers don't exist outside of this context. I think we all have an obligation--to strive to be responsible for our choices--to become moral men. (8)

. The question of good and bad is not an easy one. Whether one sees a situation as good or evil depends on his perception of the universe, and that includes a view of man--his nature and being, his reality, his freedom. These are very personal matters; there are no absolutes. For perception is, in part, a function of who and what one is, and that in turn is a function of all the physical, biological, genetic, cultural and environmental pressures to which one is exposed. Although none of these is a decisive determinant, none of them is insignificant. (12)

. For me, the basic value of life is to be real or authentic, to be who we deeply are. I am very wary and fearful of any attempts to direct or shape the existence of others towards someone else's goals. If it is a basic right of individuals to determine their own way of life, free from pressure and controls (and I believe it is), then this should, in some way, be built into a man-machine system, and the goals, assumptions, and values of the designer should be explicitly stated, so that anyone can judge if this is something they want for themselves. (1)

. I believe that every society, religion, community, etc., has a set of principles that determines its standards of conduct. There is also the feeling of obligation. In my set of principles I believe that I have an obligation as a teacher to provide the best learning situation for the student. Therefore, I must decide what is considered to be the best situation to provide for learning to take place. (3)

.   Man's basic goal in life is seen by this writer to be an achievement of "freedom"--freedom in the sense that man is able to make choices and decisions, fully aware and knowledgeable for their consequences, and subsequently, able to pursue additional choices and decisions independent of external judgment. (4)

.   What is my view of man and reality? Man is finite and unique. No two people are alike, each differs in some respect from every one else. A sense of individuality emanates from his understanding that he is unique, separate and different from others. The fact that every individual has his own unique personality does not mean that no laws concerning human personality and behavior can be established, and I would use the computer to explore these laws and hypothesize which type of counseling situation would be most effective with which type of individual as I do not believe all individuals, because of their individual differences, should be counseled by the same method. Research should be directed toward finding which types of counselor is [sic] most effective in changing behavior with which type of problem with which type of person.

Man has a self, and he enlarges his self by his experiences and his experiences with others. This experience cannot be mechanized at present, and I do not think it should be because we get a lively part of self-knowledge by understanding the experiences of other people. By identifying ourselves with the inner experience of others, we enlarge our knowledge of ourselves as human beings; we gain self-knowledge, and this is a necessary step to self-direction. It has been argued that if there were no other people, and a man's experience grew only from his meetings with stones and stars, he might well remain a machine and have no consciousness. We live by human links. We know what another man feels when he feels angry, because we have been angry ourselves. We know what tenderness feels like, and fear, and curiosity, and cruelty and fun. I do not want this mode of knowledge formalized as I do not think we can make a tape of the emotional interaction of humans. (6)

.   It might even be said that in solving the problems of physical survival and launching an economy of abundance, modern science and technology have left man more directly and inescapably confronted with questions of value, purpose, and ultimate meaning than ever before. The difficulty in finding answers has been pointed out by the development and the wide-spreading popularity of existentialism, a school of thought based on the assumption that life has no ultimate meaning, or at least none in which man is capable of discerning. According to Rudolph Ehrenburg, the theologian and physiologist, life is simply "that process which produces corpses." The existentialists maintain that man, faced with his own death and ultimate solitude, is only what he makes of himself, and therefore must commit himself to a policy of action for the here and now. (7)

.   And when we speak of "moral" issues this is not to be confused with a puritanical orientation; but morally in the sense: "What is of worth?" "What is our measure; what our mettle?" "What is important?" Is privacy an issue?

Freedom to choose? Power, compassion, freedom to love, duty? For if we can tap our own inner resources and answer to the best of our beings, some of these questions, then we will be in a position to take conscionable action, make moral decisions; fight for, instead of react against! (8)

In conclusion, this writer would ask that each counselor who is faced with the decision of using the computer as an interaction tool be prepared to cope with the questions raised especially by an existentialist philosophy. In the mind (feelings included) of this counselor the limits of the tool have been at least in part defined and this report is presented as a grateful gesture for having been given this opportunity. (4)

REFERENCES

Listed below are reports submitted in partial fulfillment of the requirements for Education 213B, "Legal and Ethical Bases of Student Personnel Work," Department of Education in the Graduate School, The University of California at Los Angeles for Winter 1967 (Instructor: Dr. John Hanny).

1. John W. Cheesman. An evaluation of a man-machine counselling system.
2. Gwendolyn W. Ball. An ethical evaluation of the man-machine counselling system.
3. Janet M. Schubert. Ethics.
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5. Darwin C. Rouse. The computer versus man.
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13. Janice L. Layne. Man, machine, systems, and education in the computer age.
14. Ted Uno. Role of the counselor in a man-machine system.
15. Larry J. Harper. Evaluation of a man-machine counselling system.
16. James T. Quinn. Some ethical considerations for computer counselling.

APPENDIX B

COUNSELOR ACTIVITY TIME LOG

Counselor________________________ Date________________________

Time Activities

_____ a. Individual counseling
_____ b. Group counseling
_____ c. Contacts with parents
_____ d. Contacts with teachers
_____ e. Contacts with other school offices
_____ f. Contacts with outside agencies, industry, etc.
_____ g. Meetings with other counselors
_____ h. Tracking student performance
_____ i. Conducting case studies
_____ j. Helping student obtain financial aid, scholarship, placement
_____ k. Assisting students in college entrance
_____ l. Curriculum evaluation and planning
_____ m. Professional training
_____ n. Research or prediction
_____ o. Using man-machine (computer) system
_____ p. Test interpretation
_____ q. Analysis and interpretation of data
_____ r. Writing letters, reports; preparing lists
_____ s. Checking and recording data (cums, etc.)
_____ t. Course programming, scheduling, registration
_____ u. Identifying special group (Delin, Gifted, etc.)
_____ v. Reading reports, professional literature, etc.
_____ w. Supervising student help
_____ x. Distributing forms, lists, packets, etc.
_____ y. Telephone
_____ z. Noncounseling activities (drills, etc.)
_____ Other

APPENDIX F

INDIVIDUAL INTERVIEW FORMS

Form 1. Monroe
Form 2. Sepulveda

Form 1

[illegible]

Date________________

Student______________________________ Student No.________________

Others Present?____

Interview Initiated by Student____ Counselor____ Other (Specify)__________

Elapsed Time__________Minutes

Subject(s) of Interview (Check One or More):

a. _____Course Programming
b. _____Change of Program
c. _____Discussion of Credits
d. _____Discussion of Test Scores
e. _____Discussion of Grades
f. _____Acceleration
g. _____Occupational Planning
h. _____Post Secondary Educational Planning
i. _____Scholarships
j. _____Personal
k. _____Other (Specify)________________________________

Comments:

Form 2

Duplicate

Date____________________

Student________________________________ Student No.____________________

Others Present?____

Interview Initiated By: Student_____ Counselor_____ Other (Specify)_______

Approx. Elapsed Time__________Minutes

Subject(s) of Interview (Check One or More):

a. _____Initial Interview
b. _____Change of Program
c. _____Discussion of Grades or Academic Progress
d. _____Programming-Gathering Information
e. _____Programming-Imparting Information
f. _____Unsatisfactory Behavior
g. _____Discussion of Test Scores
h. _____High School Planning
i. _____Acceleration
j. _____Personal
k. _____Other (Specify)____

Comments:

APPENDIX B

LANGUAGE SPECIFICATIONS FOR THE [illegible] SYSTEM

I. DATA DESCRIPTION

The system will set up data bases of items as named and described by the user, and new items may be named, described and added to existing data bases constructed by the system. The actual structure of a data base is of no concern to the user. He need not bother with the absolute or even the relative locations of any of the items and may, therefore, imagine the data base to be structured in any form suiting his habits of thought. However, the user must concern himself to some extent with the nature of the items. He must name them so that he can refer to them in storage, retrieval and other kinds of statements. He must also tell the system what kind of data to expect (as letters or numbers) and may wish to impose certain further conditions on the nature of the data to facilitate quality checks of input data by the system.

Data description is accomplished by data description statements which consist of several parts.

A. OPERATION CODE

The operation code tells the program that the input is a data description statement. The operation code is the letter "[illegible]", followed by one or more blanks (spaces).

B. ITEM NAME

The item name is a Hollerith string by which the user intends to refer to the item in the future. It has the following restrictions:

- It must not be identical with the name of any previously described item.
- It must not be identical with any primitives of the language.
- It may not contain imbedded blanks. (Therefore, it is terminated by a blank.)

C. ITEM TYPE

There are five item types: Literal, Integer, Decimal, Categorical, and Date.

1. Literal Items

A literal item is an item whose legitimate values are Hollerith strings. Any Hollerith string (including embedded blanks) will be a legitimate value for any item subject to user-specified restrictions.

e. Restrictions on Literal Items

All literal items must be restricted in length. In addition, the user may specify restrictions on the characters that may occur within the string.

(1) Maximum Length

The user must specify the maximum number of characters to be allowed in any value for a literal item. To do this he writes the primitive "MAXLENGTH" followed by one or more spaces and the maximum number of characters to be allowed.

Example 1.

If the user wanted an item called "COMMENT", which could take as values any Hollerith string up to 36 characters in length, he would use the following item description:

```
2 COMMENT LITERAL MAXLENGTH 36
```

(2) Denial

There may occur cases in which the user knows in advance that certain characters or character strings cannot logically occur within the values for certain items. By using the DENY operator, he can tell the program to refuse to accept values that include such characters or strings. (The program then will be able to perform quality checks on input data.) To deny certain characters or strings the user types the word "DENY" followed by one or more spaces, and then, separated by spaces, all of the denied characters or strings.

Example:

Suppose the user wished to have an item called "BIRTHDATE", which could take on such values as:

JANUARY 21, 1950

or

15 MARCH 1943

or

APRIL 6 '35

Suppose further that he recalled that the six letters H, K, Q, W, X, and Z do not occur in any name of any month. He might then wish to deny any input which included those letters (since such inputs would obviously be erroneous). He could then write:

2 BIRTHDATE LITERAL MAXLENGTH 25 DENY H K Q W X Z

All inputs to the item "BIRTHDATE" would be checked by the program for inclusion of the proscribed six letters and would be rejected if any of the denied letters occur. (There are other characters such as "/", "(", "*", and "$" which do not occur in dates. Simple ways of denying them will be shown in subsequent sections.)

(3) Allowance

The ALLOW operator is a means of specifying legal characters. All characters which are not allowed are denied. The ALLOW operator is simply a convenience for the user. Clearly, the user could restrict any literal item by using only the DENY operator (or only the ALLOW operator). ALLOW and DENY operators may be used in the same item description statement. If they are both used and they contradict each other, the DENY operator will have precedence. To use the ALLOW operator, the user writes the word "ALLOW" followed by one or more spaces and then the allowed characters separated by spaces.

Example 1.

Suppose the user writes this statement:

2 THIRD LITERAL MAXLENGTH 11 ALLOW A B C D E

The program will then consider the legitimate values for the item called "THIRD" are indefinite strings up to 11 characters in length which are composed solely of the characters "A", "B", "C", "D", and "E". Thus, the following strings would be acceptable:

ACE

BAD

ABE

BEAD

ACCEDED

However, the following strings would not be acceptable:

BAFE because it includes the disallowed character, "F".

A BED because it includes a blank.

The last example dramatically illustrates the fact that a blank (or space) is a character. Since blanks were not allowed in the statement, no embedded blanks are permitted. The implication is that if an ALLOW operator is used, and blanks are intended to be legal, blanks must be specified within the allow phrase. To make this possible, the special primitive "BLANK" is used. Thus, in order to make the last string in the previous example a legal value, the item definition would have to read:

1 THIRD LITERAL MAXLENGTH 10 ALLOW A B C D E BLANK

Now the values of THIRD may legitimately include embedded blanks.

Example 5.

Suppose the user writes this item description statement:

1 FOURTH LITERAL MAXLENGTH 10 ALLOW A B XYZ

Note that "XYZ" is an allowed string of three contiguous characters. Therefore, the following values are legal:

A

ABA

XYZ

AXYZ

BXYZAB

but the following values are not:

X because X is allowed only in the string XYZ

YZ because Y and Z are allowed only in the string XYZ

ZYX because the string ZYX is not the same as XYZ

A XYZ because it contains a non-allowed embedded blank

(k) <u>Special shorthand</u>

For letters and numbers, a special shorthand is available. If the user wishes to allow all the alphabet, he may write "ALLOW A-Z" to indicate the allowance of all letters A through Z. Similarly, to allow digits he may write "ALLOW 0-9". The conventional alphabetic and numeric orders are implied so that the forms "A-F", "M-R", "0-3", and "5-8" have their conventional meanings.

The shorthand forms apply to DENY as well as to ALLOW.

Example 1.

```
I  LASTNAME LITERAL MAXLENGTH 25 ALLOW A-Z '
```

This description should allow for most last names including, as it does, all 26 letters and the apostrophe (but <u>no embedded blanks</u> because they were not specified by the primitive "BLANK").

Example 2.

Consider again the example of dates of birth given above, wherein date of birth might be expressed in the following forms:

JANUARY 21, 1959

12 MARCH 1943

APRIL 6 '55

A better description of the item "BIRTHDATE" (one which allows for more quality control) would be:

```
I  BIRTHDATE LITERAL MAXLENGTH 15 ALLOW A-Z 0-9 ,
   ' BLANK  DENY [illegible]
```

The important things to notice about this item description statement are:

(a) The ALLOW phrase allows the entire alphabet, but the DENY phrase contradicts by denying six letters. The result is the allowance of the twenty essential letters.

(b) Embedded blanks are allowed because of the use of the primitive "BLANK" within the ALLOW phrase.

(c) The statement only allows or denies characters and says nothing about the order of the characters in any value. Thus the following garbage is legal by the definition:

FEBRUARY 13½, 1985

222 PINEGROVE ROAD

A'B'C'D'E'F, ABC 'MAKE

HUNDRED 12th

GARBAGE

These strings are legal values because they do not include disallowed characters and do not exceed the specified MAXLENGTH.

Example 3.

1 DEACTIVATE LITERAL MAXLENGTH 10 ALLOW A-Z

DENY BAD

Notice that the DENY phrase denies the string "BAD" and not the characters 'B', 'A', and 'D'. Thus, some legal values are:

ABD

DAB

But the following are not legal:

BAD

BADE

CBAD

CBADE

because each involves the string "BAD".

6. Integer Items

An integer item is an item whose legitimate values are positive or negative integers (whole numbers) between $-2^{17}+1$ and $+2^{17}-1$. The values of integer items are converted by the program from hollerith into numerical form and arithmetic operations may be performed on integer item values. (This is not true of

LITERAL items even if (+) are allowed.) A simple integer item description might be:

I STUDENTNUMBER INTEGER

This would permit any positive or negative integer to be assigned as a student number within the range $-2^{35} + 1$ to $2^{35} -1$.

e. Restrictions on Integer Items

Integer item values may be restricted with respect to their minimum and/or maximum permissible values.

(1) Minimum values

A minimum legal value for an integer item may be imposed by use of the "MIN" operator. Thus, if the user wanted no student number (item "STUDNO") to be less than 1000 he might write:

I STUDNO, INTEGER MIN 1000

This would cause the program to reject all input student numbers below 1000. Note that 1000 would be a legitimate student number. The "MIN" operator can be used to specify that only positive integers are to be allowed:

I FIGURE INTEGER MIN 1

(2) Maximum values

A maximum value for an integer item may be imposed by use of the "MAX" operator. If the user wanted to specify that the values for an item "DEFICIT" were to be negative integers, he might write:

I DEFICIT INTEGER MAX -1

Then, only negative integers (including -1) would be legal values for item "DEFICIT".

If the user wanted the item "COURSE NUMBER" to assume no values higher than 310 he would write:

I COURSE NUMBER INTEGER MAX 310

This would allow any positive or negative number equal to or less than 310 to be a value for the item COURSENUMBER. Note that since no minimum has been specified, negative course numbers would be legal.

(3) Maximum and minimum values

Maximum and minimum values may be specified within the same integer item description statement. When both a MAX and a MIN operator occur within an integer item description statement, they may be replaced by a RANGE operator.

Example:

If the user wanted to define an item "DIGIT" to have legal values of one through 10 only, he would write:

```
2 DIGIT INTEGER RANGE 1 TO 10
```

The use of more than one RANGE operator specifies multiple intervals.

Example:

The following input would require that the values of the integer item DIGIT be between 1 and 5 or between 6 and 8.

```
2 DIGIT INTEGER RANGE 1 TO 5
        RANGE 6 TO 8
```

3. Decimal Items

A decimal item is an item whose legitimate values are positive or negative decimal numbers between $-(2^{35}-1)$ and $(2^{35}-1)$. They may be restricted in range by the user.

Examples:

```
2 [illegible] DECIMAL RANGE 1 TO 10.

2 [illegible] DECIMAL RANGE -3.2 TO 16.75
```

4. Categorical Items

Basically, a categorical item is a literal item whose legitimate values are specified in extension by the user, and which may, at the user's option, be assigned numerical values. The legitimate values are listed, separated by one or more blanks. No categorical item value may contain embedded blanks.

Example 1.

A very simple example is an item for a student's sex which may take on only the values "M" and "F". Here, the user might write:

1 SEX CATEGORY M F

The same thing could be accomplished with a literal item using the following statement:

1 SEX LITERAL ALPHABETIC 1 [illegible] M F

Clearly, not much has been saved by using "CATEGORY" in place of "LITERAL". To illustrate the usefulness of the item type "CATEGORY" we next find another example.

Example 5.

Suppose a user wanted an item to represent a student's letter grade (mark) in some course. He might write:

1 GRADE CATEGORY A+ A A- B+ B B- C+ C C- D D- F

INC NM

(The last two values represent "incomplete" and "no mark.") This would do the job quite well. If he were to try to accomplish the same end with a literal item (and slightly more compact form) he might write:

1 GRADE LITERAL ALPHABETIC 3 [illegible] INC NM

This would be fine except that the following unwanted forms would be allowed:

AA

+

+D

ABC

NM+

Strong though this example may be, the real power of the categorical item is yet to be seen.

6. Assignment of Numerical Values

There will arise occasions on which the user will want to assign numerical values to specified non-numerical values of categorical items. When this is done the numerical values will be retained in storage and can be used in arithmetic operations. To make such a numerical assignment, the user will employ the primitive "=".

Example:

```
I GRADE CATEGORY F = 0  D- = 1  D = 2  C- = 3  C = 4  C+ = 5
   B- = 6  B = 7  B+ = 8  A- = 9  A = 10  A+ = 11
```

The result of this statement will be: to convert any legal letter grade that is input into the assigned number; to output any stored *number* as the equivalent letter grade; to consider any letter grade with a larger assigned numerical value as being greater than any letter grade with a smaller assigned numerical value. Therefore, one may obtain an average grade or ask if one letter grade is *greater* than another (e.g., ...IF GRADE GR C...).

b. Partial Assignment

In the example of the previous section, the user may wish to allow the GRADE values of INC and WH. For the purposes of average grade, they should have no numeric value. Therefore, the description should read:

```
I GRADE CATEGORY F=0  D-=1  D=2  C-=3  C=4  C+=5  B-=6  B=7  B+=8
   A-=9  A=10  A+=11  INC WH
```

The values "INC" and "WH" are assigned no numerical values. Therefore, they will not enter into any numerical operations (except counting). Furthermore, relational operators will not apply to them. (If one were to ask if "GRADE GR F" and the student's mark happened to be INC, the program would not be able to say whether "INC" was greater than, less than, or equal to "F". Asking if "GRADE GR INC" is a meaningless question.)

c. Multiple Assignment

There will occur occasions in which the user will want several categorical values to assume the same *numerical* value. For example, the user may wish to allow "M" *and* "MALE", and "F" *and* "FEMALE" to be legal values for the item SEX. If he assigns numerical values to the categories, he will want "M" and "MALE" to be assigned the same value so that they will be treated equivalently by the program. He would write, say:

```
I  SEX CATEGORY  M = 0  MALE = 0  F = 1  FEMALE = 1
```

which would accomplish his objective. However, if he wished to *retrieve* the SEX value for some student, the program would not know *whether* the number zero should be converted into "M" or "MALE". In order to eliminate ambiguity, a convention has been established: If two or more categorical values are assigned the same numerical value, only the first categorical value will be used in any output. Thus, in the case above, zero would always be output as "M" and never as "MALE"; 1 would always be output as "F" and never as "FEMALE". The convention implies that the user should be very careful about the order in which multiple assignments are made.

5. Date Items

A date item is an item whose values are dates, e.g., date of birth; date of entry into present or previous school. The legal values of date items are dates expressed in terms of month, day, and year. A number of the conventional ways of writing dates will be permitted.

a. Numerical Forms

Numerical forms for dates specify month, day, and year in numbers separated by dashes or slashes.

Examples:

1-22-67 meaning January 22, 1967

2/27/66 meaning February 27, 1966

b. "Alphanumeric" Forms

In these forms the month is expressed in letters and the year may be abbreviated. Certain standard abbreviations for months will also be allowed:

Examples:

JANUARY 1 1966

JAN 1 1966

JAN. 1 1966

JAN 1, 1966

1 JAN 1966

1 JAN '66

JAN 1 66

c. Incomplete Forms

The day or the day and month may be omitted. Thus the following forms will be legal:

JAN 1966

FEB '66

1-66

1966

66

6. Tables

All discussion of items to this point has considered that for any given student each item has one and only one value. For example, the student has only one SEX value (M or F). There are, however, items which may have several values for one student. One such item is the student's subjects or courses for a particular semester. Suppose that a student is taking the following courses:

Physical Education

Spanish III

French II

Geometry I

World History

English II

He would, then, have 6 values for the item which might be called "SUBJECT". However, if the user used the LITERAL item description statement as described above, the program would allot space for only one value for SUBJECT. In order to cause the program to make provision for multiple values for an item, the special pseudo-item type "TABLE" is used. The form of the statement is:

I COURSE TABLE 7

Where: I is the usual operation code for item description;

COURSES is the name by which the user wants to refer to the

entire table of values;

TABLE is the pseudo-item type;

The number (in this case 7) is the anticipated maximum number

of values.

Note that the statement is not a true item description statement; in fact, the statement does not refer to an item at all, but simply names a table (a collection of item values), and indicates how many values an item in the table can have. The "table" statement must be followed by a true item description statement to describe the multi-valued item that will be contained in the table. For our example, the two statements might look like this:

```
I  COURSES TABLE 7

I  SUBJECT LITERAL MAXLENGTH 20
```

The program would now be able to set up space for seven subject names, each being no more than 20 characters long.

For reasons that will become clear, it is necessary to terminate a "table" description with another pseudo statement, which repeats the table name and uses "END" as the "item type." The full table description of our example would be:

```
I  COURSES TABLE 7

I  SUBJECT LITERAL  MAXLENGTH 20

I  COURSES END
```

We have seen how to describe a table consisting of one item, which may have many values. We shall now consider the case of a table that consists of many items, each of which may have many values. Let us extend our example to include marks as well as subject names. We might have the following data for some student:

SUBJECT	MARK
Physical Education	B
Spanish III	A
French II	A
Geometry I	B-
World History	C
English II	A

Now we have two items to be described: SUBJECT and MARK. Furthermore, there will be the same number of values for each. That is, for each course taken, there is a grade. Our table description might look like this:

```
    1  COURSES TABLE 7

    2  SUBJECT LITERAL   MAXLENGTH 30

    3  MARK CATEGORY     F=0  D-=1  D=2  D+=3  C=4  C+=5  B-=6

                         B=7  B+=8  A-=9  A=10  A+=11  INC

                         WD

    1  COURSES END
```

III. DATA RETRIEVAL STATEMENTS

A data retrieval statement is a request for data to be retrieved from the data base. Such requests may be made either from the teletype keyboard or by card input. The retrieved data may be output on either the teletype or the high-speed printer.

A retrieval request consists of four ordered elements:

(a) Operation code.

(b) Specification of the information to be retrieved (the direct object).

(c) Specification of the population (the student or students from whose records retrieval is desired).

(d) Conditions determining the time at which retrieval should be initiated.

Elements (a) and (b) must occur in every retrieval request. Elements (c) and (d) are optional; however, omission of either of these elements from a retrieval request has certain well-defined implications, which are described below.

A. OPERATION CODE

The operation code tells the program that the input is a retrieval request (as distinguished from any other kind of statement such as a storage request or a calculation statement). The code consists of the letter "G".

B. SPECIFICATION OF INFORMATION TO BE RETRIEVED

This element must occur in every retrieval request. The basic unit of this element is the name of an item in the student data base--the item to be retrieved. More than one item may be specified within one retrieval request by listing all desired item names separated by commas, e.g., "NAME, GPA, SEX". The primitive "SAME" may be used for this element to indicate the same item or items called for in the last retrieval statement.

C. SPECIFICATION OF THE POPULATION

If no population is specified within a request, the population is *implied*. The population implied for a given request is the population specified or *implied* for the preceding request. Thus, once a population is specified, it is implied for all subsequent requests until another population specification is made. A population specification element *must* begin with the word "FOR". There are two general types of population specifications: extensive and intensive.

1. Extensive Population Specifications

An *extensive* population specification consists of the word "FOR" followed by one or more student names, or one or more student numbers. Some examples of requests involving extensive population specifications are:

Q GPA FOR MARY JONES. Meaning "retrieve the grade point average for Mary Jones, and forget the request."

Q NAME, GPA FOR 1237. Meaning "retrieve the name and grade point average for student number 1237 and forget the request."

Q GPA, AGE FOR MARY JONES, JOHN GOODSPEED.
Meaning "retrieve the grade point average and age for all students named MARY JONES or JOHN GOODSPEED and forget the request."

Q GPA FOR MARY JONES, 377.
Meaning "retrieve the grade point average for MARY JONES and the student whose number is 377 and forget the request."

Q SEX, GPA. Meaning "retrieve the sex(es) and grade point average(s) for the population specified or implied in the last retrieval request and forget the request."

6. Interactive Population Specifications

Element (c), Population Specification, may include qualifiers to define a logical subset of the total student population. A qualified specification must begin with the words "FOR ALL" to signal that there are population qualifiers. The word "WHERE" may be used after "FOR ALL" to make the statement more readable; it is, however, not necessary and will be ignored by the program. Population qualifiers are phrases of the form:

Item name, logical operator, item value.

Examples:

Population Specification	Meaning
FOR ALL WHERE SEX EQ F.	All female students
FOR ALL WHERE GPA GR 3.00.	All students with GPA greater than 3.00
FOR ALL WHERE GRADE GQ B11.	All 11th and 12th grade students

Any number of qualifying conditions may be expressed within a population specification by connecting simple logical phrases with "AND" or "OR" where these words have their usual meaning in formal logic. (The "OR" connective has the meaning of an inclusive "OR".)

Examples:

Population Specification	Meaning
FOR ALL WHERE SEX EQ F AND GPA LQ 2.00.	All female students with GPA equal to or less than 2.00
FOR ALL WHERE GRADE GR A11 AND GPA GQ 3.00.	All 12th grade students with GPA of 3.00 or more
FOR ALL WHERE GRADE EQ B11 OR GRADE EQ A11.	All B11's or A11's

Parentheses may be used to clarify ambiguities resulting from compound logical phrases with AND's and OR's. The phrase or phrases within a given pair of parentheses may be regarded as a single logical phrase. This logical phrase may then be connected to other phrases using the AND or OR.

The negation of a qualifying condition is accomplished by the use of the word "NOT" placed before the expression to be negated. If the negation of a complex logical phrase is intended, the NOT is followed by the logical phrase enclosed in parentheses. For the negation of a simple logical phrase, parentheses are not necessary.

Examples:

Population Specification	Meaning
FOR ALL USERS NOT SEX EQ F.	All nonfemale students
FOR ALL USERS NOT (GPA GT 3.00 OR GPA LS 1.00).	All students with GPA between 1.00 and 3.00

D. TIME CONDITIONS

This element permits the user to specify the time at which the retrieval should begin. This time may be specified by: day of the week, date, a number of days hence, or the useful concept of "tomorrow." In addition, the user may give the hour of day at which retrieval should be initiated. If no time condition is included in a retrieval request, TODAY is implied. If no hour of day is specified, the implication will be the earliest possible moment on the day specified or implied.

1. Day of the Week

A time condition specifying a day of the week consists of the word "ON" followed by the name of the day.

Example:

"ON FRIDAY" meaning "whenever the day of the week is Friday."

2. Date

A time condition specifying a date consists of the word "ON" followed by the month, day, and year separated by dashes.

Example:

"ON 1-15-67" meaning "whenever the date becomes January 15th, 1967."

3. A Number of Days Hence

A time condition specifying a number of days hence consists of the word "IN" followed by a number of days and the word "DAYS".

Example:

"IN 5 DAYS" meaning "five days from now."

4. Tomorrow

A time condition specifying the school day following the day the request is input is indicated by the word "TOMORROW".

5. Hour of Day

An hour of day may be attached to any of the four time conditions above. An hour of day condition consists of the word "AT" followed by a time in common hour and minute notation.

Examples:

TOMORROW AT 10:00

ON THURSDAY AT 1:30

ON 6/25/67 AT 3:00

AT 1:15

If no hour of day is specified, the request will be acted on at the earliest possible time on the day specified or implied.

B. QUALIFYING TABULAR DATA TO BE RETRIEVED

The reader will recall (see Section 3) that there are cases in which more than one datum for a given student is assigned the same name. These are data that occur in tables (such as SUBJECT, MARK, etc.).

A statement such as

G SUBJECT FOR MARY JONES.

is not without a measure of ambiguity. Which subject names are to be retrieved? To resolve the ambiguity the user must employ qualifiers to specify the desired subject names. These qualifiers correspond rather closely to adjectives in natural English in their function and occurrence. If one wanted to know the subjects that Mary Jones took as a 10B, one might say to a clerk, "Get me the 10B subjects for Mary Jones." Note the qualifying adjective "10B" put in front of the item name "subjects." Our retrieval language is quite similar in that it uses "adjectival" qualifiers appended to item names. The qualifiers are relational statements, contained within parentheses, placed immediately before or after the tabular item name to be qualified. For example, if the user wants Mary's 10B subjects, he may use either of the following statements:

G ((GRADE EQ B+)) SUBJECT FOR MARY JONES.

or

G SUBJECT ((GRADE EQ B+)) FOR MARY JONES.

(It will be shown later that there are certain advantages in considering the qualifier as an adjective and, following normal English usage, having it precede the item name. Although it is legal for the "adjective" to either precede or follow, it will precede in most of the examples given hereafter.)

The adjectival qualifiers may be complex; that is, they may consist of a number of relational statements connected by AND or OR. For example, to get the names of subjects in which Mary was doing poorly as an A9, we might write

G ((GRADE EQ A9 AND MARK LQ 3)) SUBJECT FOR MARY JONES.

Or if we wanted to know what subjects Mary took in the 10th grade:

G ((GRADE EQ A10 OR GRADE EQ B10)) SUBJECT FOR MARY JONES.

As a convenience to the user, qualifiers may be concatenated with connecting AND's or OR's:

G ((GRADE EQ A9) AND (MARK LQ 3)) SUBJECT FOR MARY JONES

or

G ((GRADE EQ A10) OR (GRADE EQ B10)) SUBJECT FOR MARY JONES.

Furthermore, the connector "AND" may be omitted; that is, the two following statements will mean the same thing:

G ((GRADE EQ A9) AND (MARK LQ 3)) SUBJECT ....

G ((GRADE EQ A9) (MARK LQ 3)) SUBJECT ....

There will, of course, be cases in which the user wants to retrieve tabular information where more than one item name will bear an adjective. The previously explained convention of commas separating items will be observed in such cases. However, care must be taken not to put a comma between an adjective and the item name it modifies.

Example:

G NAME, (GRADE EQ A10) SUBJECT, (GRADE EQ A10 AND MARK LQ 3) MARK

FOR ALL.

5. "Distributive" Adjectives

Sometimes several similar items will be desired, all of which are to be modified by the adjective. For example, in order to get Mary Jones' 4th grade subjects, marks, days absent and cooperation, one might write:

? (GRADE EQ 4th) SUBJECT, (GRADE EQ 4th) MARK, (GRADE EQ 4th) DAA,

(GRADE EQ 4th) COOP FOR MARY JONES.

Repeating the same adjective many times as in our example is cumbersome. In English, a single adjective can be used to apply to a set of nouns and the retrieval language has a similar convention. However, natural language usage is ambiguous. In the sentence: "Get me yellow bananas, oranges, and apples," it is not clear whether the adjective "yellow" applies to oranges and apples as well as bananas. Our retrieval language may not be ambiguous. It must, therefore, differ from natural language forms to some degree. Special signs will be used to indicate that an adjective applies to a set of nouns rather than to a single noun. The convention is that when an adjective is to be distributed over a set of nouns (item names) that adjective must be followed by a colon, ":", and the nouns (item names) must be separated by slashes, "/", rather than commas.

Example:

? (GRADE EQ 4T): SUBJ/MARK/DAA/COOP FOR JOHN DOE.

This statement has exactly the same meaning as:

? (GRADE EQ 4T) SUBJ, (GRADE EQ 4T) MARK, (GRADE EQ 4T) DAA,

(GRADE EQ 4T) COOP FOR JOHN DOE.

The first statement is much easier to write and to read because the adjective is distributed over the nouns.

A distributed adjective does not have to apply to all items requested; it applies only to those items, connected by slashes, which immediately follow it.

? NAME, (GRADE EQ 3RD) SUBJ, (MARK LQ 3):MARK/DAA/COOP

FOR ALAN A. DALE.

In this example, no adjective applies to NAME; SUBJ is modified only by "(GRADE EQ 3RD)"; MARK, DAA, and COOP are all modified by "(MARK LQ 3)".

Items which are modified by distributed adjectives may also be modified by adjectives which are not distributed. For example in this statement:

G ((GRADE EQ 10)): SUBJ/((MARK EQ D) MARK FOR MARY JONES.

Both SUBJ and MARK are modified by "(GRADE EQ 10)" but only MARK is modified by "(MARK EQ D)".

c. Some Examples

SUBJ	MARK	ABS	TARD	GRADE
P.E.	C	2	4	10
ALGEBRA I	D	0	0	10
ENGLISH II	B	0	0	10
U.S. HISTORY	F	1	2	10
WOODWORK	C	4	3	10
BAND	A	3	3	10

Let us look at some retrieval statements and see what they would retrieve.

a. G ((GRADE EQ 10)): SUBJ/MARK FOR MARY JONES.

The information retrieved would be:

P.E.	C
ALGEBRA I	D
ENGLISH II	B
U.S. HISTORY	F
WOODWORK	C
BAND	A

b. G ((GRADE EQ 10)): SUBJ/((MARK EQ D) MARK FOR MARY JONES.

The information retrieved would be:

P.E.	
ALGEBRA I	D
ENGLISH II	

```
U.S. HISTORY      D

HOMEROOM

BAND
```

c. G (GRADE EQ 10): SUBJ/(MARK LQ D) MARK/(HAB EQ U) HAB/(COOP EQ U) COOP FOR MARY JONES.

The information retrieved would be:

```
S.S.

ALGEBRA I         D

ENGLISH II                  U

U.S. HISTORY      F    U

HOMEROOM

BAND
```

d. G (GRADE EQ 10):(MARK LQ D OR HAB EQ U OR COOP EQ U):SUBJ/MARK/HAB/COOP FOR MARY JONES.

Would yield:

```
ALGEBRA I         D    S    U

ENGLISH II        D    S    U

U.S. HISTORY      F    U    S
```

3. Special Convention for Current Class

A special convention will be employed for the convenience of the user: If no GRADE is specified, the current class will be implied. Thus

G SUBJ FOR MARY JONES.

will mean "list all the subjects Mary is currently taking."

III. DATA STORAGE LANGUAGE

Storage statements are used to insert data into the data base. In form, they are very similar to retrieval statements, although their functions are very different.

A storage request consists of four ordered elements:

(a) Operation code.

(b) Specification of the information to be stored.

(c) Specification of the population (the student or students for whom the information is to be stored).

(d) Conditions determining the time at which storage should be initiated.

Elements (a), (b), *and (c)* must occur in every storage statement. Element (d) is optional. (Notice that unlike retrieval statements, storage statements must contain element (c).)

A. OPERATION CODE

The operation code is the letter "S" for "store."

B. SPECIFICATION OF INFORMATION TO BE STORED

This element is the name of the item (or items) to be stored. If more than one item is to be stored, the several item names are separated by commas.

C. SPECIFICATION OF THE POPULATION

Population specification *must* occur within a storage statement; it is *not* optional here as it is within a retrieval request. The population specification element begins with the word "FOR". There are two general types of population specifications: extensive and intensive.

1. Extensive Population Specifications

An *extensive* population specification is one in which each student for whom data are to be stored is explicitly identified by student name or number. If more than one student is specified, their names or numbers are separated by commas. Some examples are:

```
S NAME FOR 1357.

S STUDNUM FOR MARY SMITH.
```

S SEX FOR MARY SMITH, JOHN DOE.

S GPA FOR JOHN DOE, 1357, MARY SMITH.

2. Intensive Population Specification

Intensive population specifications identify the population without referring to individual students, but by specifying the characteristics of the students to be included in the population. There are two types: total and qualified specification.

Total population specification is indicated by the word "ALL" which means that the entire student population is to be used.

Example:

S NAME FOR ALL.

Qualified population specifications include qualifiers which define subsets of the total population. They consist of the word "FOR ALL WHERE" followed by one or more qualifying phrases. Qualifying phrases have the form:

Item name - relational operator - item name

Examples:

FOR ALL WHERE SEX EQ F

FOR ALL WHERE CLASS GQ B12

Any number of qualifying phrases may be included within a population specification if they are separated by "AND" or "OR".

IV. THE DEFINE STATEMENT

The define statement is a means whereby the user may make certain kinds of changes in the user language to simplify frequently used expressions, to satisfy idiosyncratic desires, or to make the user language more English-like (and hence, easier to use or teach). It is simply a string-substitution device and yet, used in conjunction with the peculiar structure of the basic language described in previous sections, it can make a great contribution to ease of use.

A. FORM

The form of the define statement is:

"D x = y." Where D is the operation code (standing for "define");
x and y are character strings; and x must satisfy
certain conditions specified below.

The effect of a define statement is to cause the program to treat certain subsequent occurrences of the character string x exactly as though they were the character string y. (The string y will, of course, still be interpreted according to its original meaning.)

The string y may assume any form desired by the user. There is one form for y that deserves special attention: the null form. It is often convenient to define a previously meaningless string as being equal to nothing (or blank). The string y so defined may be used freely by the user and will be ignored by the program. The form for defining a null is:

D x = .

Once this statement has been made, the program will treat the string x as though it were a blank.

B. RESTRICTIONS

The string x is free to vary within certain restrictions:

1. It must not contain embedded blanks
2. It must not be identical to any of the primitives of the language.
3. It must not be identical to any already meaningful term (item name, table name, or previously defined string).
4. It must consist of two or more characters.
5. It must begin with a letter.
6. It must not include any of the following characters: + - * / ( ) . ,

A string that has been defined will not be translated by the program if it is embedded within or concatenated with another string. Thus, if the user employs the definition

D LASS = FEMALE.

the string "CLASS" will not be interpreted as "CFEMALE".

C. EXAMPLES

1. The Simplification of Frequently Used Expressions

Suppose a user finds frequent need to use the following retrieval request:

```
G  STUNO, NAME, CREDITS FOR ALL WHERE CLASS EQ B12
       OR CLASS EQ A12.
```

Suppose, further, that he tires of typing such a lengthy statement. Realizing that the student population involved in the request is all seniors, he may simplify the expression by using a define statement.

```
D  SENIORS = CLASS EQ B12 OR CLASS EQ A12.
```

Now he may write:

```
G  STUNO, NAME, CREDITS FOR ALL SENIORS.
```

(Remember that the word "WHERE" is really unnecessary.)

This new retrieval request will have exactly the same meaning as the lengthier request above. However, he might wish to simplify the request even further by introducting another define statement:

```
D  CREDITCHECK = STUNO, NAME, CREDITS.
```

He may now write the original request in a quite simple form:

```
G  CREDITCHECK FOR ALL SENIORS.
```

Finally, if he is really lazy, he may define once again,

```
D  SENIORCHECK = CREDIT CHECK FOR ALL SENIORS.
```

To simplify the request still more:

```
G  SENIORCHECK.
```

The ultimate definition might be

```
D  DOIT = G  SENIORCHECK.
```

Now the request

```
DOIT.
```

will have exactly the same meaning as the original request. (He could, of course, have achieved the same goal in one step by defining

```
        D  DOIT = G  STUNO, NAME, CREDITS FOR ALL WHERE CLASS

                     EQ B12 OR CLASS EQ A12.)
```

2. Making the Language More Natural

Definitions such as

```
        D  GET = G.

        D  DEFINE = D.

        D  STORE = S.
```

lead to a slight increase in natural appearance, permitting statements such as

```
        GET NAME FOR ALL WHERE SEX EQ F.
```

The definition

```
        D  FEMALES = (SEX EQ F).
```

allows one to write:

```
        GET NAME FOR ALL FEMALES.  (Remember, "WHERE" is unnecessary.)
```

However, the last statement cries out for a plural direct object. So we may define

```
        D  NAMES = NAME.
```

and then say:

```
        GET NAMES FOR ALL FEMALES.
```

Having gone this far we might as well define

```
        D  OF = FOR.
```

so that we may express the request as:

```
        GET NAMES OF ALL FEMALES.
```

Now, suppose we added the following definitions:

```
D  B12 = (CLASS EQ B12).

D  THE = .
```

We could then say:

```
GET THE NAMES OF ALL B12 FEMALES.
```

The structure of the language is such that the following two statements have exactly the same meaning:

```
GET THE NAMES OF ALL B12 FEMALES.

GET THE NAMES OF ALL FEMALES B12.
```

However, the second is decidedly inferior English. In order to preserve freedom of order the user may wish to define

```
D  FEMALE = FEMALES.   and

D  B12'S - B12.
```

Now the two statements

```
GET THE NAMES OF ALL B12 FEMALES.

GET THE NAMES OF ALL FEMALE B12'S.
```

not only have the same meaning in the user language, but also are equivalent to each other in English.

Now let us add a few more definitions so that we may construct more complex, yet natural retrieval statements.

```
D  GIRLS = FEMALE.

D  A12 = (CLASS EQ A12).

D  A12'S = A12.

D  SENIOR = (A12 OR B12).

D  SENIORS = SENIOR.

D  PASSING = (MARK GQ C).

D  FAILING = (NOT PASSING).
```

```
D  ENGLISH = (COURSE EQ 134 OR COURSE EQ 135 OR COURSE EQ 136).

D  WHO = .

D  ARE = .
```

Some retrieval statements which are now possible are:

```
GET THE NAMES OF ALL SENIOR GIRLS.

GET THE NAMES OF ALL FEMALE SENIORS.

GET THE NAMES OF ALL FEMALE SENIORS WHO ARE PASSING.

GET THE NAMES OF ALL PASSING FEMALE SENIORS.

GET THE NAMES OF ALL SENIOR GIRLS WHO ARE FAILING.

GET THE NAMES OF ALL FEMALES WHO ARE FAILING ENGLISH.
```

D. TRANSLATION AND CANCELLATION

Two special operations, "Translate" and "Cancel," are associated with definition.

1. Translation

The translation operation permits the user to get a translation of any previously defined string.

The operation code is "T" for translate, and the form is:

```
T x.
```

If the string x has been defined, the program will respond with the definition.

Example:

```
(USER)   D GET = G.

(USER)   T GET.

(SYSTEM) G
```

V. I/O FORM DESCRIPTION LANGUAGE

At certain times it will be necessary to read in or print out large amounts of data using certain prespecified formats. Some cases of input are: initial loading of the data base from cards; recording students' marks for the 15th week progress reports; teachers' recommendations of candidates for reading classes. Some output examples are: progress reports; program cards; the total cum.

A. INPUT FORMS

If data are to be read into the data base from cards, it is necessary that the program know what data are on the cards and where each datum occurs on the card. This information is supplied to the program by an input form description. Once an input form has been described and named, it may be called upon by name at any time without being redefined. Statements within an input form description are used to: name the form; move an imaginary pointer from column to column or from card to card; identify card field ranges; specify data base items to be loaded from cards.

1. Naming the Form

The user begins a form description by typing the letter "F", at least one space, and the name of the form. The form name may be any string of characters satisfying the following restrictions:

a. It must not contain embedded blanks.

b. It must begin with a letter.

c. It must not be identical with any of the system primitives, item names, or table names.

2. Moving the "Pointer"

The form description language includes commands which permit the user to position an imaginary pointer to any column on any card. This pointer is used to direct the program to the locations of fields of data on the cards.

a. Locating the Pointer on a Specific Column

"COL x", where x is a positive integer between 1 and 80 inclusive, will move the pointer to column x on the card being inspected.

b. Skipping Over Columns

"SKIP x", where x is a positive integer between 1 and 79, will skip the pointer over x columns to the right. If x is a negative integer between -1 and -79, the pointer will be moved x columns to the left. If x does not lie in the intervals 1 to 79 or -1 to -79, an error condition will result.

c. Skipping Blank Columns

The command "NEXT" will cause the pointer to move to the next nonblank column of the card.

d. Skipping Cards

The command "CARD" will cause the pointer to move to column 1 of the next card. If the word "CARD" is followed by a positive integer, x, the pointer will skip x cards and be positioned at column 1 of the next card.

3. Item Specification

An item specification within an input form description is an indication to the program that the pointer is properly positioned for a particular datum which should then be read in. The data to be read in are identified by the names of the data base items they are to load, and card field lengths are specified. In addition, certain restrictions may be placed on the form of the data.

The input data must satisfy the requirements of data base item descriptions. However, the user may wish to apply more stringent conditions of data input through any form.

a. Item Name

The name of the item to be loaded is the first element of an item specification. It must correspond to an item already described in an item description statement.

b. Field Length

Field length may be specified in two ways: by absolute length, or by maximum length.

(1) Absolute length

The user may indicate the absolute length of a field by a number representing the card columns (characters) in the field.

Example:

NAME 24

This item specification means that the 24 columns to the right of the pointer position are to be loaded into the data base item called "NAME", and the pointer is to be automatically moved 24 columns to the right. The program will check the input data against the data base item description for item NAME, and data that violate the conditions of that description will not be loaded. The length (in this case 24) need not be the same as the MAXLENGTH given in the data base item description, but must not be greater than the MAXLENGTH.

(2) Maximum length

There may arise cases in which the exact field size of an item on the card is unknown or may, in fact, vary from card to card. In such a case the user may wish to specify a maximum length for the field. The program will then read in the maximum length or up to the first illegal character--whichever occurs first.

c. Special Restrictions

If the user has prior knowledge about the data to be input, he may know that certain values for particular items should not occur even though they are legal according to the data base definitions.

4. Form Termination

To indicate the end of an input form description, the user employs the primitive "END" followed by the form name.

5. Input For Examples

For the sake of brevity, let us consider a data base consisting of only three items per student: student number, student name, and sex. In order to load or update this data base from cards, we wish to define an input form to read cards into the data base. However, it is first necessary that the items be defined for the data base. Let us suppose that this has already been done and that the definitions look like this:

```
I  STUNO, INTEGER MIN 1 MAX 5000

I  NAME, LITERAL ALLOW A-Z ' BLANK MAXLENGTH 35

I  SEX, CATEGORY  M = 1  F = 2
```

Now the user must tell the program how the data are arranged on the cards. Suppose the cards have the following format:

Card Columns	Information
1-4	Student number
7	Sex
10-12	Grade point average
21-55	Student name

There are a number of ways in which a form description of these cards could be written, all of which would result in the cards being read properly. Four different but equivalent descriptions will be given.

Example 1

```
F  DATAIN

COL 1

STUNO 4

COL 7

SEX 1

COL 21

NAME 35

CARD

END DATAIN
```

(Note that the unwanted piece of information, the GPA, has simply been ignored.)

Example 2

```
F  DATAIN

COL 1

STUNO 4

SKIP 2

SEX 1
```

```
SKIP 13
NAME 35
CARD
END DATAIN
```

(Here the unwanted GPA has been skipped over.)

Example 3

```
F  DATAIN
COL 21
NAME 35
SKIP -48
SEX 1
COL 1
STUNO 4
CARD
END DATAIN
```

Example 4

Let us suppose that, due to some mixup, the student sex code has been punched in column 7 on some cards and column 8 on others. The user would like his form to accept either kind of card. Use of the "NEXT" command will permit the same input form description to accommodate both card formats.

```
F  DATAIN
COL 1
STUNO 4
NEXT
SEX 1
```

```
COL 21

NAME 35

CARD

END DATAIN
```

6. Using Input Forms in Storage Statements

The name of a form may be used in place of input item name(s) in a storage statement to cause data to be read in accordance with the form description.

Examples:

```
S DATAIN FOR ALL.

S DATAIN FOR ALL FEMALES.
```

B. OUTPUT FORMS

If the user wishes to print data in a special format, he may specify that format in an output form description. Once an output form has been described and named, it may be called upon (in retrieval statements) by name at any time without being redefined. Statements within an output form description are used to: name the form; move an imaginary pointer from column to column or from line to line on a page; specify print field ranges; designate the data base items to be printed.

1. Naming the Form

The user begins an output form description with the letter "F" followed by at least one space and the name of the form. The name may be any string of characters satisfying the following restrictions:

a. It must not contain embedded blanks.

b. It must begin with a letter.

c. It must not be identical to any primitive, item name, or table name.

2. Moving the Pointer

The user may position an imaginary pointer to any column of the page to indicate where information should be printed.

a. Locating the Pointer on a Specific Column

"COL x", where x is a positive integer between 1 and 80 inclusive, will position the pointer at the xth column of the page.

b. Skipping Over Columns

"SKIP x", where x is a positive integer between 1 and 79, will move the pointer x columns to the right.

c. Skipping Lines

The command "LINE" will position the pointer at the first column of the next line. If the word "LINE" is followed by a positive integer, x, the pointer will skip x lines and be positioned at column 1 of the next line.

3. Item Specification

An item specification within an output form description is an indication of what data are to be printed. The information will be printed starting at the column on which the pointer is positioned. The item specification must also contain a number defining the print field length. When the item value has been printed, the pointer will be positioned on the column just to the right of the print field.

4. Form Termination

The word "END", followed by the form name, signals the end of the output form description.

5. Output Form Examples

Let us suppose that a user wants a printout of the name, student number, grade point average, and class for all girls who are failing English, and that he wants the following format for each line on the printed page.

Column	Information
1-24	Student name
27-30	Student number
33-35	Class
38-41	Grade point average

He might use the following output form description:

```
F DATAOUT

COL 1

NAME 24

SKIP 2

STUNO 4

SKIP 2

CLASS 3

SKIP 2

GPA 4

LINE

END  DATAOUT
```

Now form DATAOUT may be used in retrieval statements. For example:

```
GET DATAOUT FOR ALL FEMALES WHO ARE FAILING ENGLISH.
```

VI. CALCULATION FEATURES

This section describes some of the calculation features of the language. These features may be separated into two categories: (1) a calculation assistance mode which allows the user to perform quick arithmetic computations using the computer, and (2) a set of computational primitives to be incorporated within retrieval statements. Because of the inherent qualities of the latter category and its similarities to the first, it is included in this section as a calculation feature, rather than a feature of the retrieval language per se.

A. CALCULATION ASSISTANCE

The calculation assistance mode of operation is provided in order that the computer may be used as a desk calculator. The user's input is an arithmetic expression, and the program output is a numerical value.

Only a brief overview of the input format is provided here; the format is almost identical to the "CALC mode" of the PLANIT system, which will be incorporated in our software system and is described in detail in User's Guide to PLANIT, TM-3055/000/01, System Development Corporation, October, 1966.

The calculation assistance mode is entered by typing "CALC". Once in the mode, the user specifies his arithmetic expression by typing in numerical values connected by any of the following operators:

+ (addition)

- (subtraction or negation)

* (multiplication)

/ (division)

** (exponentiation)

Parentheses may be used in conjunction with these operators to indicate the level of operation.

Examples:

(user's input)	5.12*(3.1 + 4.5)
(computer response)	38.912
(user's input)	3.1 + 4.5 + 6.0 + 9.3
(computer response)	22.9
(user's input)	(-3)** 2 / 2
(computer response)	4.5

A number of functions are also available and may be used within the statement:

ABS	(absolute value)
COS	(cosine)
SIN	(sine)
SQRT	(square root)
FACT	(factorial)
SUM	(summation)
PROD	(product)

The last two are used in conjunction with the FOR primitive which allows for the varying of an integer item from one value to another by some increment.

(user's input)	FUNCTION SUMSQ(N)= SUM(I**2) FOR I = 1,1,N
(response)	IN
(user's input)	SUMSQ(5)
(response)	55

The FUNCTION primitive means that the label following the word "FUNCTION" is the function name with specified parameters; in the example presented, SUMSQ(N) sums the square of the integers I, for I equals 1, in steps of 1, up to N.

B. CALCULATION FORMS IN THE RETRIEVAL STATEMENT

1. The COUNT Primitive

The COUNT primitive is used in the retrieval statement to find the number of items in a population or subpopulation. The two basic forms are:

1. COUNT
2. COUNT anynoun

(The item "anynoun" means an item name along with any modifying adjective.)

Examples:

GET COUNT FOR ALL SENIORS.

The response to this statement would be an integer indicating how many seniors were in the school.

GET COUNT FAILING MARKS FOR MARY JONES.

The computer's response here would be an integer indicating the number of failing marks Mary Jones has received. (FAILING is assumed to be already defined as "(MARKS EQ F)".)

GET COUNT FAILING: (NAME EQ BILL SMITH) MARKS/

(NAME EQ MARY JONES) MARKS FOR BILL SMITH,

MARY JONES.

The computer's response to this request will be two integers, one for Bill Smith and the other for Mary Jones, indicating their respective number of failing marks.

2. The SUM Primitive

The SUM primitive is used to find the numerical sum of the values of an item for some population. The general form is,

SUM anynoun.

Examples:

GET SUM DAYS-ABSENT FOR ALL SENIORS.

The integer response to this input indicates the accumulated number of days the members of the senior class were not present.

GET SUM COURSE-CREDITS FOR MARY JONES.

The statement would get the total number of course credits for Mary Jones.

3. Defined Functions in the Retrieval Statements

For more sophisticated kinds of numerical retrieval requests, the capability to use a defined function within the retrieval request is provided. The calculation mode of operation is entered to specify the function; the following general format is used:

FUNCTION function-name (parameter-1, parameter-2, ...)

= arithmetic-function expression.

In a retrieval statement the "function-name" is typed in followed by the arguments separated by commas with or without bracketing parentheses.

Examples:

Probably, a very common retrieval request will be for the arithmetic mean of some item.

(user's input) FUNCTION MEAN (anynoun)=SUM(anynoun)/
COUNT(anynoun)

(computer's response) IN

This function uses the previously described COUNT and SUM primitives. The following shows how the function MEAN might be included within the retrieval statement:

GET THE MEAN GPA FOR ALL SENIOR GIRLS.

The response to this request would be a decimal number indicating the mean grade point average for the senior girls.

4. The IF Primitive

Specifying the population desired in a retrieval statement may require "interactions" or "relations" among values of different items. The primitive "IF" is used to compare or evaluate item or function values.

The IF phrase used in the population specification behaves like an adjective and appears in this format:

$$\text{IF} \left\{\begin{array}{l}\text{item-name}\\ \\ \text{function}\end{array}\right\} \quad \left\{\begin{array}{l}\text{EQ}\\ \text{NQ}\\ \text{LS}\\ \text{GQ}\\ \text{GR}\\ \text{LQ}\end{array}\right\} \quad \left\{\begin{array}{l}\text{item-name}\\ \text{function}\\ \text{numerical-value}\end{array}\right\} .$$

Examples:

GET THE NAMES, STUNOS FOR ALL SENIORS IF COUNT

FAILING MARK GR 1.

In this case COUNT is the function with the argument "FAILING MARKS". If the number of failing marks is greater than 1, the student's name and number are listed. The following is an identical request:

GET THE NAMES, STUNOS, FOR ALL SENIORS IF COUNT

GR 1 FAILING MARKS.

Here the argument of the function COUNT immediately follows the completed "IF" phrase. Let us make these definitions:

D WITH = .

D MORE-THAN = IF COUNT GR.

The above "GET" reduces to a very natural-English form:

GET THE NAMES, STUNOS, FOR ALL SENIORS WITH MORE-THAN

1 FAILING MARK.

In the second example, the counselor desires to know if a student's grades have been improving in some area:

```
GET  NAME, STUNO FOR ALL IF (A10 ENGLISH)

     MARK GR (B10 ENGLISH) MARK.
```

This is a case which involves a relationship between item values: the student's A10 and B10 English marks. Just as the argument of a function in the IF phrase may immediately follow the phrase, so may the distributed adjective. The following request is identical to the previous one:

```
GET  NAME, STUNO FOR ALL IF (A10) MARK

     GR (B10) MARK ENGLISH.
```

The use of several definitions makes the statement more natural:

```
D  WHO = .                    (no meaning)

D  ARE = .

D  IMPROVING = IF (A10) MARK GR (B10) MARK.

D  IN = .
```

We now get as a substitute for the above two retrieval requests the following statement:

```
GET NAME, STUNO FOR ALL WHO ARE

          IMPROVING IN ENGLISH.
```

Note that in this example the word "IMPROVING" can be used for any course or set of courses, or even for the student's entire program.

```
GET NAME, STUNO FOR ALL WHO ARE IMPROVING IN FR.

GET NAME, STUNO FOR ALL WHO ARE IMPROVING.
```

VII. PREDICTION SYSTEM

The system will generate prediction formulas using a multiple linear regression model. These formulas can then be used to make predictions about student data; this will enable counselors to make projections about student behavior based on past performance of the student population. In the traditional school setting, counselors have been able to examine student performance only by looking at statistical summaries or models based on very general student populations. The method to be described here will allow a counselor to study his population of students and instruct the computer to notify him in advance of students who are likely to be in trouble years later.

A. GENERATION OF FORMULAS

In order to generate a formula, a counselor must specify certain data to the computer.

1. A dependent variable, Y. This is a variable, found in the data base, that the formula will predict. This is often called the criterion variable.

2. A set of independent variables, X_1, X_2, ..., X_k. These are the variables found in the student data base from which Y is to be predicted.

3. A sample of students. The subpopulation of students on which predictions will be based must be generated from the data base.

4. A label for the model. The counselor must specify a label by which the model can be later recalled so that the computer can store the model for future use.

After these specifications have been given, the computer will generate a regression model of the form

$$Y = w_0 U + w_1 X_1 + w_2 X_2 + \dots + w_k X_k + E,$$

where the w_i are regression weights, U is a variable whose value is always 1, and E is the error, or residual, variable. The computer would then compute another model

$$Y = w_0 U + G,$$

where G is another error variable. Now if we conceive of the variables Y, U, X_1, X_2, ..., X_k, E, G as columns of data, and the lower case letters y, u, x_1, x_2, ..., x_k, e, g, as being the elements of the respective columns, then the computer will compute the Fisher statistic, f, given by

$$f = \frac{\Sigma e^2 - \Sigma g^2}{\Sigma e^2} \cdot \frac{n - k}{k - 1} \qquad (1)$$

where n is the number of students used in the sample, and the summations run from 1 to n. The probability that f is significant is reported to the counselor, as an indication of how useful this model might be.

Finally, the computer could generate a sequence of models, testing the significance of each independent variable. This would be accomplished by generating a set of k regression models of the form

$$Y = w_0 U + w_1 X_1 + w_2 X_2 + \cdots + w_k X_k + E_i - w_i X_i,$$
$$i = 1, 2, \ldots, k.$$

and computing a set of k corresponding f ratios

$$f = \frac{\Sigma e^2 - \Sigma h_i^2}{\Sigma e^2} \quad (n - k)$$

The probability p_i that variable X_i would be useful is then reported to the counselor.

Another number that could be reported to the counselor to indicate how useful the model will be is the square of the multiple correlation coefficient, R.

If

$$\hat{Y} = w_0 + w_1 X_1 + w_2 X_2 + \cdots + w_k X_k$$

then

$$R = \frac{\Sigma(y - \bar{y})(\hat{y} - \bar{\hat{y}})}{\sqrt{\Sigma(y - \bar{y})\ \Sigma(\hat{y} - \bar{\hat{y}})}}$$

where $\bar{y}$ is the mean of Y and $\bar{\hat{y}}$ is the mean of $\hat{Y}$.

B. USE OF FORMULA

After a counselor has generated a formula, he may instruct the computer to forget it, if he decides that f is not significant. In this case, the results of the computations would be discarded. If, on the other hand, he decides the model will be worthwhile, the computer can be instructed to retain the formula under the given label. It will then be available for later use.

In order to use a retained model, the counselor must specify:

- the label associated with the model;
- a population of students on which the predictions are to be made.

The computer would then, for each student in the specified population, fetch the values $x_1, x_2, \ldots, x_k$ associated with the variables $X_1, X_2, \ldots, X_k$ and apply the regression weights stored under the given label. The prediction

$$\hat{y} = w_0 + w_1 x_1 + w_2 + \cdots + w_k x_k$$

would then be generated.

C. LANGUAGE SPECIFICATIONS

The counselor using this system would not need to be familiar with the mathematical or statistical aspects of the regression model. Indeed, he should not have to know he is using a regression model. The counselor is interested in making predictions about his students; it is hoped that a computer program can be written that assumes only that.

The language with which the counselor communicates with the program for making predictions will be consistent with the other systems such as the retrieval system.

1. Generation of Prediction Model

As outlined above, certain specifications are necessary to establish a model to be used for prediction. The following form specifies the label, the dependent variable, the population, and the independent variables ("P", "FOR", and "USING" are primitives):

```
        P label = dependent variable FOR population USING independent variables.
```

This form would instruct the computer to generate a certain regression model. This model may then be applied to make predictions.

As an example, suppose a counselor wishes to construct a model for predicting 10th-grade algebra marks:

```
        P  ALGEBRA-SUCCESS= A10 ALGEBRA MARKS FOR

                B11'S USING IQ, MATH-APTITUDE, SEX.
```

Note that some of these terms have been defined by DEFINE statements, e.g.:

```
        D  B11'S = (CLASS-B11).
```

The computer might reply:

```
        PREDICTIVE ABILITY = .86

        SIGNIFICANCE OF MODEL = .97

        SIGNIFICANCE OF IQ = .95

        SIGNIFICANCE OF MATH-APTITUDE = .96

        SIGNIFICANCE OF SEX = .65
```

The counselor might decide that the significance of the variable SEX is so low that it is not useful as a predictor of algebra marks. He could then say:

ELIMINATE SEX.

This command would drop the independent variable SEX from the prediction equation, and the computer would regenerate the prediction model and report the new results.

When the counselor decided to accept the model, he would say:

ACCEPT ALGEBRA-SUCCESS

and the computer would store the model under that label.

REJECT ALGEBRA-SUCCESS

would instruct the machine to forget the model.

2. Using the Prediction Model

After the model has been generated, the counselor may then use it by using a retrieval statement

GET label FOR population.

Applying the model described in the last section as an example, the counselor could say

GET ALGEBRA-SUCCESS FOR A9'S.

The computer would then list the predictions (probably off-line) for the counselor.

VIII. TRACKING AND MONITORING

Tracking and monitoring is a special case of retrieval. In general, these routines will be used for information about situations which (1) are of low frequency of occurrence, (2) have potentially serious consequences, and (3) may pass unnoticed until they lead to disaster for a student. A tracking and monitoring statement is, in effect, a retrieval statement which remains in force until deleted. Anytime there are any data satisfying the request they will be reported.

The format of a tracking and monitoring statement resembles that of a retrieval statement: an operation code; the data to be retrieved; the student population; a descriptive statement to serve as a header for the data when output.

A. THE OPERATION CODE

The operation code is "M" (for monitor).

B. THE DATA TO BE RETRIEVED

This specification conforms exactly to the rule of retrieval statements. However, whether asked for or not, the student number and name will be supplied by the program.

C. THE POPULATION

The population specification follows exactly the rules for population specification of retrieval statements.

D. THE DESCRIPTIVE STATEMENT

Since tracking and monitoring requests may be answered long after their input, the user may not know the import of the data when they are output. Consequently, the system will demand that the user input a comment to be used as a heading for the output data. This comment must be enclosed in quotation marks.

Examples

Using some obvious and presumably common define statements and calculation forms, the following monitoring statements are possible:

```
MONITOR NAME, STUNO, CLASS FOR ALL GIRLS WHO ARE GOING DOWN
    IN ENGLISH.  ''THESE GIRLS' GRADES ARE FALLING IN ENGLISH.''

MONITOR P.E. MARKS OF ALL WHOSE P.E. ABSENCES ARE GREATER
    THAN 5.  ''THESE KIDS HAVE MISSED MORE THAN 5 DAYS OF P.E.''
```

E. CYCLE TIME

The monitoring request is *constantly* in force. Therefore, data eligible for report at one moment may still be eligible one minute later. Clearly it is not desirable that all such data be reported again and again, every minute. Consequently, a convention will be employed: An implicit "cycle time" will be employed. The effect of the cycle time will be that if data on a particular student have been output in response to a certain monitoring statement, that student's data will not be used again in response to that statement until the cycle has elapsed. We do not know at this time what the cycle time should be. It may be that the cycle should be one semester. However, we must wait for empirical evidence of usage by counselors. When such evidence has been collected and analyzed, it may be necessary to include cycle time as a user input.

IX. THE "REMINDER SECRETARY"

The "Reminder Secretary" permits the counselor to store messages which will be typed out for him at a specified later time. A reminder statement consists of three parts: the operation code; the time specification; and the message.

A. OPERATION CODE

The operation code is "R" for "remind."

B. TIME SPECIFICATION

The time at which the message is to be displayed to the counselor is specified by using any of the date and time forms employed in retrieval statements. (See Section II.)

C. THE MESSAGE

The message may be whatever the user wishes. However, in granting such freedom to the user, it is necessary to have a way of indicating the beginning and end of the message. The user will enclose the message in double quotation marks.

Examples:

```
R ON FRIDAY  ''SUMMON JOHN ARKINS TO DISCUSS HIS

                PROGRESS IN ENGLISH.''

R TOMORROW  ''CALL DOBBS COMPANY ABOUT CAREER DAY.''

R ON OCT. 2  ''START IDENTIFYING OVER AGE STUDENTS.''
```

Once a reminder message has been output for the counselor, it will be deleted from his message file.

APPENDIX H

INDIVIDUALIZED LETTERS PREPARED WITH PLANIT

This appendix contains samples of output from a PLANIT program designed to produce individualized letters to students. The letters are to be prepared for eighth-grade students who have expressed an interest in taking algebra in the ninth grade. In its present form, the program considers only five variables: the student's A8 math grade; his scholastic capacity stanine; his mathematics fundamentals stanine; his score on the math department's screening test; and his teacher's recommendation. As the program is further developed and refined, other variables may be added.

Sample 1

This letter is for a student who is above average in general ability, but is weak in mathematics.

```
THE PURPOSE OF THIS LETTER IS TO HELP YOU DECIDE ABOUT YOUR PLANS
FOR STUDYING ALGEBRA.  YOU INDICATED ON THE GREEN FORM THAT YOU
ARE THINKING OF TAKING ALGEBRA NEXT YEAR.  YOUR COUNSELOR FEELS
THAT THIS IS AN IMPORTANT DECISION IN YOUR EDUCATIONAL PLANNING
AND THAT YOU SHOULD GIVE THIS DECISION MORE THOUGHT.  THE INFOR-
MATION IN THIS LETTER SHOULD HELP YOU DECIDE.  READ IT AND TAKE
IT HOME SO THAT YOU AND YOUR PARENTS CAN CONSIDER THE DECISION
TOGETHER.

IF YOU DO TAKE ALGEBRA NEXT YEAR, YOU WILL WANT TO BE SUCCESSFUL
AND PASS THE COURSE.  HOWEVER, MANY STUDENTS FIND ALGEBRA DIFFICULT
AND ARE NOT AS SUCCESSFUL IN IT AS THEY WOULD LIKE TO BE.

ONE WAY OF GETTING AN IDEA OF YOUR CHANCES FOR SUCCESS IN ALGEBRA
IS TO LOOK AT SOME INDICATORS OF YOUR MATH ABILITY.  IN THIS LETTER
WE SHALL CONSIDER:  (1) YOUR A8 MATH MARK; (2) YOUR SCHOLASTIC
CAPACITY STANINE; (3) YOUR MATHEMATICS FUNDAMENTALS STANINE;
(4) YOUR MATH DEPARTMENT TEST SCORE; (5) YOUR MATH DEPARTMENT'S
EVALUATION OF YOU.

YOUR TEN WEEK MARK IN A8 MATH WAS C.

A MARK OF C INDICATES THAT YOU ARE DOING AVERAGE WORK IN MATH AT
THE PRESENT TIME.  SINCE ALGEBRA IS A MORE DIFFICULT MATH COURSE,
IT WOULD BE REASONABLE TO EXPECT THAT YOU WOULD GET A LOWER MARK
IN ALGEBRA THAN THE C YOU ARE GETTING NOW.

THE SCHOLASTIC CAPACITY STANINE IS AN INDICATOR OF HOW YOU COMPARE
WITH OTHER STUDENTS IN YOUR ABILITY TO DO SCHOOL WORK.
```

YOUR SCHOLASTIC CAPACITY STANINE IS 7.

THIS SCORE INDICATES THAT YOU ARE ABOVE AVERAGE. THIS IS A POSITIVE SIGN BECAUSE IT SUGGESTS THAT YOU MAY HAVE THE ABILITY TO DO THE WORK. HOWEVER, YOUR MARKS IN MATH ARE NOT VERY HIGH. PERHAPS YOU ARE NOT FULLY USING YOUR ABILITY.

THE MATHEMATICS FUNDAMENTALS STANINE IS AN INDICATOR OF HOW YOU COMPARE WITH OTHER STUDENTS IN YOUR ABILITY TO UNDERSTAND AND USE THE FUNDAMENTALS OF ARITHMETIC.

YOUR MATHEMATICS FUNDAMENTALS STANINE IS 5.

YOUR SCORE IS AVERAGE. MOST STUDENTS WHO TAKE ALGEBRA IN THE 9TH GRADE WILL HAVE HIGHER MATHEMATICAL FUNDAMENTALS STANINES THAN YOURS. THIS CAN MAKE IT RATHER DIFFICULT FOR YOU.

YOU PROBABLY REMEMBER TAKING THE MATH DEPARTMENT TEST A FEW WEEKS AGO.

YOUR SCORE WAS 11 OF A POSSIBLE 24 POINTS.

THAT IS NOT A VERY GOOD SCORE. IT INDICATES LOW MATH ABILITY. YOU SHOULD SERIOUSLY CONSIDER CHANGING YOUR PLANS FOR TAKING ALGEBRA NEXT YEAR.

ANOTHER INDICATOR IS YOUR MATH DEPARTMENT'S EVALUATION OF YOU. YOUR MATH TEACHER DOES NOT FEEL THAT YOU WILL BE ABLE TO SUCCEED IN ALGEBRA IF YOU TAKE IT NEXT YEAR. SINCE THIS EVALUATION IS BASED ON YOUR ACTUAL CLASS PERFORMANCE, IT IS PROBABLY THE BEST INDICATOR OF YOUR CHANCES.

IN GENERAL YOUR INDICATORS ARE NEGATIVE. THIS DOES NOT MEAN THAT YOU CANNOT OR SHOULD NOT EVER TAKE ALGEBRA. REMEMBER, YOU DO NOT HAVE TO TAKE ALGEBRA IN THE 9TH GRADE. YOUR SCORES SEEM TO SUGGEST THAT WHAT YOU OUGHT TO DO IS TAKE 9TH GRADE MATH AND WORK HARDER ON YOUR MATH FUNDAMENTALS. IF YOU MAKE A B OR BETTER IN 9TH GRADE MATH, YOU SHOULD BE ABLE TO HANDLE ALGEBRA IN HIGH SCHOOL.

A QUESTION WHICH YOU SHOULD ASK YOURSELF (IF YOU HAVEN'T ALREADY) IS, "DO I REALLY NEED TO TAKE ALGEBRA?" SOME HIGH SCHOOL MAJOR SEQUENCES REQUIRE ALGEBRA AND OTHERS DO NOT. DOES YOUR INTENDED HIGH SCHOOL MAJOR SEQUENCE REQUIRE ALGEBRA?

ALSO, ALGEBRA IS NOT REQUIRED BY SOME COLLEGES FOR SOME MAJORS. IF YOU ARE PLANNING TO GO TO COLLEGE, YOU SHOULD FIND OUT IF ALGEBRA IS AN ENTRANCE REQUIREMENT FOR YOUR INTENDED MAJOR AT THE COLLEGE YOU PLAN TO ATTEND.

WE HOPE THIS LETTER WILL HELP YOU IN MAKING YOUR DECISION ABOUT ALGEBRA. BE SURE TO DISCUSS THE QUESTION WITH YOUR PARENTS.

Sample 2

This letter is for a student of average general ability who is, however, quite strong in mathematics.

THE PURPOSE OF THIS LETTER IS TO HELP YOU DECIDE ABOUT YOUR PLANS FOR STUDYING ALGEBRA. YOU INDICATED ON THE GREEN FORM THAT YOU ARE THINKING OF TAKING ALGEBRA NEXT YEAR. YOUR COUNSELOR FEELS THAT THIS IS AN IMPORTANT DECISION IN YOUR EDUCATIONAL PLANNING AND THAT YOU SHOULD GIVE THIS DECISION MORE THOUGHT. THE INFORMATION IN THIS LETTER SHOULD HELP YOU DECIDE. READ IT AND TAKE IT HOME SO THAT YOU AND YOUR PARENTS CAN CONSIDER THE DECISION TOGETHER.

IF YOU DO TAKE ALGEBRA NEXT YEAR, YOU WILL WANT TO BE SUCCESSFUL AND PASS THE COURSE. HOWEVER, MANY STUDENTS FIND ALGEBRA DIFFICULT AND ARE NOT AS SUCCESSFUL IN IT AS THEY WOULD LIKE TO BE.

ONE WAY OF GETTING AN IDEA OF YOUR CHANCES FOR SUCCESS IN ALGEBRA IS TO LOOK AT SOME INDICATORS OF YOUR MATH ABILITY. IN THIS LETTER WE SHALL CONSIDER: (1) YOUR A8 MATH MARK; (2) YOUR SCHOLASTIC CAPACITY STANINE; (3) YOUR MATHEMATICS FUNDAMENTALS STANINE; (4) YOUR MATH DEPARTMENT TEST SCORE; (5) YOUR MATH DEPARTMENT'S EVALUATION OF YOU.

YOUR TEN WEEK MARK IN A8 MATH WAS A.

THIS IS A GOOD SIGN. IT INDICATES THAT YOU ARE DOING ABOVE AVERAGE WORK IN MATH AT THE PRESENT TIME.

THE SCHOLASTIC CAPACITY STANINE IS AN INDICATOR OF HOW YOU COMPARE WITH OTHER STUDENTS IN YOUR ABILITY TO DO SCHOOL WORK.

YOUR SCHOLASTIC CAPACITY STANINE IS 6.

THIS SCORE INDICATES THAT YOU HAVE AVERAGE SCHOLASTIC ABILITY. IF YOU TAKE ALGEBRA, YOU WILL BE COMPARED WITH STUDENTS WHO ARE MOSTLY ABOVE AVERAGE IN SCHOLASTIC ABILITY. THAT MEANS THAT YOU WOULD HAVE TO SHOW EVIDENCE OF BEING A VERY GOOD WORKER IN MATH TO DO WELL IN ALGEBRA.

THE MATHEMATICS FUNDAMENTALS STANINE IS AN INDICATOR OF HOW YOU COMPARE WITH OTHER STUDENTS IN YOUR ABILITY TO UNDERSTAND AND USE THE FUNDAMENTALS OF ARITHMETIC.

YOUR MATHEMATICS FUNDAMENTALS STANINE IS 8.

YOUR SCORE IS ABOVE AVERAGE. WHEN YOU HAVE ABILITY, THE THING THAT MAKES THE BIGGEST DIFFERENCE IS WHETHER OR NOT YOU CAN APPLY IT.

YOU PROBABLY REMEMBER TAKING THE MATH DEPARTMENT TEST A FEW WEEKS AGO.

YOUR SCORE WAS 22 OF A POSSIBLE 24 POINTS.

YOUR SCORE INDICATES THAT YOU HAVE SOME ABILITY IN MATH. BY ITSELF THIS SCORE IS NOT TOO IMPORTANT. BUT CONSIDERED WITH OTHER INDICATORS, IT SHOULD HELP YOU TO FORM SOME IDEA OF YOUR GENERAL MATHEMATICAL ABILITY.

ALTHOUGH NOT ALL THE INDICATORS ARE POSITIVE FOR YOU, YOUR MATH DEPARTMENT FEELS THAT YOU WILL PROBABLY BE ABLE TO DO WELL IN ALGEBRA NEXT YEAR. THE REASON FOR THIS IS PROBABLY BASED ON YOUR TEACHER'S FEELINGS THAT YOU ARE A HARD WORKER, OR THAT YOU HAVE STRONG MATHEMATICAL ABILITY, OR BOTH.

WE HOPE THIS LETTER WILL HELP YOU IN MAKING YOUR DECISION ABOUT ALGEBRA. BE SURE TO DISCUSS THE QUESTION WITH YOUR PARENTS.

APPENDIX I

SEPULVEDA

MASTER CALENDAR

Period in
September
Before
School Starts

1. Be sure there is publicity in the local newspaper about registration of new pupils.
2. Work with administration on the opening term bulletin to be sure that all activities related to the Counselor's Office are included.
3. Evaluate the Marking Survey from previous semester and send results to teachers.
4. Organize preregistration and arrange time each grade counselor will register pupils. Keep preregistration tally.
5. Record summer school marks in cums.
6. Review A9 cumulative records and prepare them for transfer according to bulletin in file under "Transfer of Cum Cards." Screen for proper recording of marks. Screen anecdotal data for libel, etc.
7. Be sure Counselor's Office materials are in all teachers' mailboxes. See list under "Opening Day Bulletin."
8. Prepare the library for preregistration. Contact service group sponsors (student hosts for tours of new students).
9. Meet with new teachers. Explain procedures and interpretation of test data.
10. Faculty meeting. Review opening day procedures.
11. Provide copy of master program to secretary.
12. Arrange for substitute teachers for grade counselors who will be registering late arrivals on first day.
13. Order A8 and A9 Educational Decisions Units materials.

First Week

1. Preregistered B-7 pupils report to homeroom as given on Homeroom Assignment card.
2. Register new pupils in Library.
3. Class enrollment blanks in teachers' mailboxes all week. Check against grade level master for total count.
4. Balance classes and adjustment program.
5. Brief the office practice pupils.
6. Assist in the preparation of the permanent program day bulletin.
7. Distribute Pupil Personnel Information forms to B-7 homeroom teachers.
8. Arrange for B-7 autobiographies in B-7 English.
9. Work with B-7 Grade Counselor on B-7 Orientation Assembly.
10. Participate in B-7 orientation tours (through English classes).

Second Week

1. Balance classes.
2. Class enrollment blanks Monday through Wednesday.
3. Permanent Program Day (Thursday).
4. Get final class tally.
5. Have the B-7 Pupil Personnel Forms returned and used by the credit clerk in completing B-7 cums.
6. Prepare for state evaluation (8th grade).
7. Order Selection of Program blanks from Graphic Arts. Get principal's approval.

Third Week

1. Meet with A-8 and A-9 English teachers. Distribute Educational Decision Unit materials and brief teachers on procedures and schedule.
2. Work out a testing schedule for state evaluation of B-8's and A-8's.

Third Week (Cont'd)

3. Take inventory of testing materials and other counseling supplies. Prepare the supplemental order requisition that is due at Evaluation and Research in October. (Order unisort supplies if money available.)

4. Brief typing service on report cards.

Fourth Week

1. Make preparations for fifth-week progress report.

2. Identify over-age pupils. Alert vice principals to all cases.

3. Brief teachers who will be involved in state evaluation (eighth-grade English, math, and history teachers).

4. Arrange to meet new teachers to explain about the records and guidance procedures.

5. Scholarship-citizenship assemblies.

Fifth Week

1. Supervise progress reports.

2. Grade counselors make Fail, D, and U lists from vice principals' copies. (Lists originate with homeroom teachers.)

3. Grade counselors and V.P.'s decide on students to carry Daily Progress Reports.

4. Grade counselors begin pupil and parent conferences on unsatisfactory notices or poor progress reports.

5. Confer with principal regarding the organization for planning the master program. Registrar supplies estimated enrollment.

6. Begin state evaluation (STEP testing).

Sixth Week

1. Preliminary work on the master program. Teacher preference forms in mailboxes.

2. State evaluation (STEP and math).

3. Grade counselors continue pupil and parent conferences concerning unsatisfactories.

4. Call Monroe High as to dates for orientation assembly and 9-10 program planning.

5. A-9 Orientation Assembly (Monroe counselor visit).

Seventh Week

1. State evaluation (math, reading, language).
2. Organize guidance assemblies.
3. Complete tentative master program with principal.
4. File B-7 autobiographies and Pupil Personnel Information forms in cums.

Eighth Week

1. State evaluation make-up testing.
2. Guidance assemblies.
3. Work on report card bulletin or information for faculty meeting.

Ninth Week

1. Report cards (Fall only).
2. State evaluation make-ups.
3. Grade counselors make lists of Fails, D's, and U's (Fall only).
4. Prepare programming materials.
5. Counselors meet to prepare for programming.

Tenth Week

1. Algebra Readiness Test given. (A-8's--Results may be given to students at teacher's discretion.)
2. Programming materials assembled (Monday).
3. Grade counselors meet with homeroom teachers and give them programming materials (Unisort Card, Elective List, etc.)
4. Programming in homeroom (Unisort cards).
5. Prepare B-10 program cards.
6. Report cards (Spring only).

Eleventh Week

1. Programming continued.
2. All programming material, including report cards, collected.

Eleventh Week (Cont'd)

3. Get recommendations for regrouping or special classes from teachers.
4. Prepare list of recommended Algebra candidates.

Twelfth Week

1. Record 10-week shop and health marks in cum.
2. A-6, B-7 transfer data cards due from elementary schools.
3. Test data on Selection of Program blanks.
4. Survey Algebra candidates with B-9 counselor.
5. Grade counselors group and tally students.
6. Collect A-8 and A-9 HGR's.

Thirteenth Week

1. Progress reports (Fall semester).
2. Grade counselors prepare Fail, D, and U list.
3. Adjust master program.
4. Programming by grade counselors.

Fourteenth Week

1. Programming by grade counselors.
2. Grade counselors interview pupils with poor progress report.
3. Schedule A-6 visits.

Fifteenth Week

1. Progress report (Spring semester).
2. Programming by grade counselors.
3. Head counselor programs incoming B-7's.
4. Release summer school information (Spring semester).

Sixteenth Week

1. Programming.

Seventeenth Week

1. Prepare materials for A-6 visits.
2. Work on closing bulletin.
3. Programming.
4. Remind teachers of unsatisfactory notices.

Eighteenth Week

1. Final check on A-9's.
2. State Social Studies examinations in history classes.
3. Visitation of elementary schools. Leave Homeroom Assignment card.

Nineteenth Week

1. Program Preview Day (Friday). Students see programs for next semester.
2. Homeroom teachers record significant information on cums.
3. Review State Social Studies test failures.

Twentieth Week

1. Final report cards.
2. Get Fail and D list from Algebra and Foreign Language teachers.
3. Send A-9 Fail and D list to Monroe High School.
4. Reprogram failures.
5. Announce homeroom changes.
6. Arrange for recording of A-9 marks (Fall semester).
7. Homeroom teachers complete recording.
8. Discuss demotions and promotions.

APPENDIX J

CALENDAR EVENTS FOR MONROE

I. SEQUENCE OF EVENTS RELATED TO COUNSELING FUNCTIONS

A. SUMMER

1. During the summer, Welcome Envelopes are mailed to the new B-10's. These envelopes contain: Emergency Information Card (to be filled out and brought in when registering); Viking Activity Card; registration dates.

2. Preregistration for the Fall Semester takes place one week before the beginning of the Fall Semester.

B. THE FALL SEMESTER

1. First Week

   a. Registration (for students who have not preregistered) takes place on the first day of the Fall Semester.

   b. Students are assigned to grade counselors, and record rooms (3rd period) are assigned.

   c. Grade counselors help students adjust programs and make program changes as required (up until Permanent Program Day).

2. Second Week

   a. Counselors continue to assist students in adjusting programs.

   b. Records for the new B-10's are picked up from the junior high schools (Attendance, Health, Cums).

   c. Classes are adjusted as necessary (balancing, dropping, forming new classes).

   d. Permanent Program Day.

   e. Reading tests are given in B-10 English classes. Tests are scored and low students are assigned to Reading Improvement and/or Basic Classes.

3. Third Week

   a. Grade counselors check permanent Program Cards against roster from ADA files in Attendance Office and summon students to complete or correct programs when necessary.

   b. Beginning of review of B-12 cums and individual conferences with B-12 students to go over Senior Check List.

4. Fourth Week

   a. New students fill out Pupil Personnel Information Form.

   b. State testing program administered. (Begins October 15.) Raw data are sent downtown for processing. Two copies of results are returned. One copy goes in cum; the other is given to the student with interpretation.

5. Fifth Week

   a. Fifth week grade check. Teachers send reports to parents. Copy of D, Fail, U report sent to counselor. Counselors check reports to identify students with problems, summon them and try to help. Counselors may arrange for Individual Progress Reports.

6. Tenth Week

   a. Report cards (quarter marks) are distributed.

7. Twelfth Week

   a. Counselors visit classes once to assist in programming for the Spring Semester.

8. Twentieth Week

   a. Final report cards.

   b. "Running for Classes"--preregistration for the Spring Semester occurs on the last day of the Fall Semester.

C. THE SPRING SEMESTER

1. First Week (Spring)

   a. Registration for Spring Semester takes place on the first day of the semester.

   b. Counselors help students with program changes as required.

2. Second Week (Spring)
    - a. Counselors continue to help students with program changes.
    - b. Classes are adjusted as necessary (balancing, dropping, etc.).
    - c. Permanent Program Day.
3. Third Week (Spring)
    - a. Grade counselors check permanent Program Cards against roster from ADA files in Attendance Office and summon students to complete or correct programs as necessary.
4. Fifth Week (Spring)
    - a. Check on failing A-12's. Send reports to parents every five weeks.
5. Sixth Week (Spring)
    - a. Counselors make two visits to the junior high schools to orient A-9's and assist them in programming. On the second visit they pick up marked Course Request cards and B-10 Program Plan cards.
6. Tenth Week (Spring)
    - a. Report Cards (quarter marks) sent out.
7. Late in Spring Semester
    - a. Final check made on failing seniors to remove their names from list of graduating seniors.
    - b. Late in the Spring Semester, counselors make two visits to Monroe classes to assist in programming. They pick up Tentative Program forms and completed Course Request cards on the second visit.
    - c. Grade counselors check Tentative Programs and Course Request cards for correctness and summon students for individual conferences if program problems are found.
    - d. Monroe students who have missed programming are summoned and programmed in a group meeting.
    - e. Course Request cards are sent downtown, tallied and returned. Summary listing provides the basis for the master schedule.

f. Student programs are checked against cums for appropriateness and students are summoned to confer on program changes where necessary.

g. Students who wish to attend summer school apply.

h. Counselors summon students who should attend summer school to fulfill requirements.

i. Counselors confer individually with students about summer school programs.

II. SPECIAL FUNCTIONS INVOLVED IN REGISTRATION

A. REGISTRATION (FALL SEMESTER)

On the first day of the Fall Semester, those students who have not preregistered are registered in the Multipurpose room (or in the Gym). There is a station for each grade level and a station for newcomers. Newcomers must bring a yellow admittance card from the Attendance Office. All students are programmed and scheduled. All counselors are released from all classes on this day.

B. PERMANENT PROGRAM DAY

Permanent Program Day occurs in the second week of the semester. On this day an attempt is made to finalize all programs. Third period (record room) teachers distribute six copies of the Program Card to their students. One card goes to each of the following: Attendance Office (buff copy); main file in counselors' office; Health Office; Boys' V.P.; Girls' V.P.; Grade Counselor. The first two copies are carried by the students to each class and are signed by the teachers. (The students fill in the teachers' names on the other copies.) All copies are collected by the third period teachers who check them and distribute them to the six recipients listed above.

C. PREREGISTRATION (SPRING SEMESTER)--RUNNING FOR CLASSES

"Running for classes" occurs on the last day of the Fall Semester and is equivalent in purpose to the fall preregistration. Students receive Program Card in their third period class, and are provided with lists of teachers, rooms, periods, etc. They schedule themselves and run to teacher stations where they give the teachers class cards and the teachers sign their Program Cards. Tallies are kept at teacher stations and classes are closed when filled. Counselors are available during this time to assist students who need help in programming.

D. PREREGISTRATION (FALL SEMESTER)

Preregistration occurs one week before the beginning of the fall semester, and lasts about three days. Students plan their schedules in the cafeteria area using a form similar to the Tentative Program form. They are provided with instructions and information on teachers, periods, etc.

After having planned their schedules, students go the Multipurpose Room where they fill out a Class Admission Ticket for each class they want to take. Each Class Admission Ticket is left at a depository corresponding to the appropriate class. A monitor at the depository keeps a count of class size and closes the depository when the class is filled. Notice of closed classes is posted outside the Multipurpose Room door and broadcast on the public address system. Students who must change their schedules because of the closing of classes, do so at tables in the MP room.

E. PROGRAMMING

Normal programming of new B-10's takes place during Junior High School visitation.

Programming involves two visits late in the semester by counselors to classes (A-10, B-10 English; A-11, B-11 Social Studies; B-12 U. S. Government). Before the first visit an announcement and program plan form is sent to each student. With the aid of the Senior High School Handbook, students plan for the next semester.

On the first visit students fill out lower part of Tentative Program form showing present program, summer school courses, and tentative new program with IBM number of each course. Counselors assist and advise the students. All three copies of the Tentative Program form are picked up by the counselors.

Between visits, the grade counselors check each Tentative Program form to make sure that requirements are being met.

The second visit occurs one week after the first visit. The Tentative Program forms are returned to the students who are permitted to add courses but not to revise in any other way. Course Request cards are filled out and collected. Tentative program forms are signed by students and the white and blue copies collected.

F. JUNIOR HIGH SCHOOL VISITATIONS

The Junior High Schools are visited twice during the spring semester.

1. Head counselor and student leaders address A-9 students and orient them to Houses (6th week). Certain materials and forms are left with students.

    a. Major Sequence List.

    b. High School Graduation Requirements.

    c. List of Electives.

    d. General Instructions for Program Planning.

    e. A-9 English teachers are given Program Planning Information.

2. Before the second visit students fill out B-10 program plan card with assistance from their A-9 English teachers and counselors.

3. On the second visit, students sense-mark Course Request Card using course numbers from list of courses to be offered. Monroe counselors assist and answer questions. B-10 Program Plan Cards, Course Request Cards, and Educational Guidance Records are collected.

III. THE GUIDANCE COURSE

The Guidance Course is a 10-week course taken in either B-10 or A-10. (The remaining 10 weeks are generally spent in Driver Education, a required course.) It is conducted by members of the Counseling Staff.

Some of the aspects of the course are:

- Administration and interpretation of aptitude (DAT) and interest (OII) tests.
- Six semester program planning.
- Consideration of graduation requirements.
- Use of the Guidance Summary Sheet.
- Discussions about high school majors and vocational plans.
- Discussion of post-high school plans.
- Self-exploration.
- Round-table discussions (concerned with immediate problems, such as school, social, etc.).

APPENDIX K

MONROE

SCHOLARSHIP COORDINATOR AND COLLEGE ADVISOR AND AMERICAN FIELD SERVICE SPONSOR

Functions

1. Acquire and maintain files of college catalogs and other information about colleges.

2. Collect scholarship information from:

    a. College catalogs and bulletins.

    b. Industry (e.g., Lockheed, Cosmetology, etc.).

    c. Service Organizations (Veterans groups, League of University Women, etc.).

    d. State and Federal scholarships and loans (NDEA, NROTC, etc.).

3. Disseminate scholarship information to students and teachers. Prepare bulletins and/or broadcasts on critical dates for application or qualification.

4. Act on requests from colleges or other organizations for applications by students who fulfill certain scholarship requirements.

    a. Disseminate information to students and teachers by bulletin or direct contact.

    b. Search records for students who meet requirements.

    c. Notify (perhaps summon) students who possibly qualify.

5. Consult individually with students about college and scholarship possibilities.

    a. Review student records (preferably before meeting with student).

        i. Elementary school cum.

        ii. Junior High and Senior High cum.

        iii. Pupil Personnel Information Form.

iv. Aptitude, Achievement and Interest Test scores.

v. Guidance Summary Sheet.

b. Discuss with student his aptitude, achievement and interests. Go over Guidance Summary Sheet. Interpret scores.

c. Explore student's academic aspirations and discuss their appropriateness.

d. Investigate student's personal desires (Stay in city? Stay in state? Type of college desired.)

e. Discuss characteristics of colleges which student might find interesting. Use college catalogs and books about colleges and majors, list of colleges which specialize in given majors. List colleges by:

i. Cost.

ii. Difficulty (and entrance requirements).

iii. Degrees offered.

f. Attempt to discover if financial aid is needed. May send home parent's confidential statement (a College Scholarship Service form). May advise parents on college costs.

g. Explore requirements for scholarships at schools which interest student.

h. Assist student in finding a match between his desires and available offerings.

i. May write recommendation for student.

As American Field Service Sponsor

Locate appropriate homes for visiting foreign students.

1. Publicize in school via bulletins and/or class visits by selected students.

2. Submit names of potential hosts to the American Field Service Commission.

3. Aid in screening and home visits.

4. Make recommendations to the New York Office of AFS for acceptance or rejection.

APPENDIX I

SUMMARY OF PROBLEMS

MONROE

1. Time-consuming clerical duties:
    - ○ Generating lists (gifted students, slow students, college-bound students, etc.).
    - ○ Keeping track of things to be done (students who should be checked on periodically, parents to be contacted, progress reports to be sent out, etc.).
    - ○ Following up check items (students on work experience or short days, are students in required courses for grade level, etc.).
2. Difficulty in keeping up with program changes and locating student at any time.
3. Insufficient information to care for students adequately (cums, records of interviews, records of parent conferences, Pupil Personnel Information forms, etc., are deficient).
4. Difficulty in keeping up with changing vocational and college information.
5. Poor communication with other school offices (vice principals' offices, attendance office, health office, child welfare, etc.).
6. Poor communication and rapport with teachers.
7. Cums and other files are inconveniently located.
8. Counselor-to-student ratio makes effective counseling impossible.
9. Physical plant totally inadequate--lack of space, privacy.

[illegible]

1. Time-consuming clerical duties:
    - ○ Writing up records of interviews.
    - ○ Recording information in cums.
    - ○ Compiling lists and reports (D, F, U; honor students; remedial reading candidates).

2. Reprogramming students (fails, retention, accelerations, summer school, etc.).

3. Difficulty in obtaining necessary up-to-date information (changes in marks, promotions, previous teachers, information from other offices, etc.).

4. Not enough time to see all students in a one-to-one interview.